

Railway Age Gazette

Including the Railroad Gazette and The Railway Age

PUBLISHED EVERY FRIDAY; AND DAILY, EIGHT TIMES IN JUNE; BY
THE RAILROAD GAZETTE (INC.), 83 FULTON ST., NEW YORK.

CHICAGO: Plymouth Bldg. CLEVELAND: Williamson Bldg.
LONDON: Queen Anne's Chambers, Westminster.

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Subscription, including regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico.....	\$5.00 a year.
Canada	\$6.00 a year.
Foreign Edition, London.....	£1 12s. (\$8.00) a year.
Single Copies.....	15 cents each.

Shop Edition and the eight M. M. and M. C. B. Convention Daily Issues, United States and Mexico, \$1.50; Canada, \$2.00; Foreign, \$3.00. Entered at the Post Office at New York, N. Y., as mail matter of the second class.

VOL. XLVIII., No. 21.

FRIDAY, MAY 27, 1910.

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GENERAL NEWS SECTION

SUPPLY TRADE SECTION.....

Some odd though transitory vagaries in railway receipts are pretty sure to follow the coming readjustments upward of passenger fares. It is due, in large degree, to the legal requirement of thirty days' notice in filing the new rates. Thus a commuter may on the twenty-ninth day buy a long-time commutation ticket and make a gain if his old ticket has but a short time left to run. In like manner the steady traveler on regular unlimited tickets may—if he has the cash—lay in a stock of regular tickets at the old rate to be used for a greater or less part of the new rate period. Then there is the increased prospective purchase of mileage books, in either the case where the price will not be raised or where it is feared that it will be raised. Such conditions forecast,

for the short periods immediately preceding the increase of rates, a considerable enlargement of passenger receipts, to be followed by temporary diminutions later. Finally, there is a factor, usually minor, to be reckoned in, due to some transfer of passenger traffic to the competing electric lines. In a case like the New Haven, with hundreds of miles of paralleling electric lines owned by itself, this means only the shifting of receipts from one pocket to the other; in other cases it means, generally within narrow limits, a real subtraction from passenger revenue more or less persistent. All these influences referred to bear mainly on short distance passenger traffic, probably to be made good or show positive gains a little later in long-distance business. But for a few months following the increased fares one may look for some interesting, not to say puzzling, disturbances in passenger receipts of the steam roads, and, in some instances, opportunity for edifying study.

The bill to amend the Interstate Commerce act, which has been approved by the House of Representatives in committee of the whole, directs the Interstate Commerce Commission to "proceed forthwith to investigate and ascertain the value in money of all the property of every railway in the United States." In determining this value, the commission is directed to ascertain "the original cost of construction, the amount expended in permanent improvements, betterments and extensions, what portion of the earnings have been invested in permanent improvements, betterments and extensions, and the extent to which such earnings are represented by stocks and bonds. It shall also ascertain the original cost and value of the right-of-way and terminal grounds, and the present value thereof exclusive of improvements, also the value of the improvements." The valuation shall be *prima facie* evidence before the commission and in the federal courts. Railway managers do not regard the plan for a general valuation with such apprehension as they did a few years ago. They are confident that if fairly made it would show that the cost of reproducing the physical properties as a whole would greatly exceed the aggregate capitalization of railways, this being based largely on the results of the valuations made by the commissions in Minnesota, Washington and other states. Those who oppose valuation do so mainly because they think it will be worthless in fixing reasonable and non-discriminatory rates. The value of the property becomes a factor to be considered in the regulation of rates only when it is contended that rates fixed or proposed are confiscatory; and the fixing of rates that are reasonable and rates that barely avoid confiscation are two entirely different things. However, regulating authorities show a strong tendency to try to reduce rates to where they will barely yield a "fair return"—in other words, to where they will barely avoid confiscation. A valuation might, perhaps, be useful as drawing distinctly the limit beyond which regulation of rates cannot go without confiscation. If a valuation is made, we shall be surprised if it does not show that the railways as a whole are not now earning "a fair return on the fair value" of their properties. It would be interesting then to observe the attitude commissions and shippers would take toward the general advances in rates which it would clearly justify.

The experiments, made by Mr. McBain, showing the inequality of expansion of locomotive boiler sheets, as described on another page, are of considerable practical value, but should be carried still further. Considering the high cost of maintenance of wide fireboxes, it seems remarkable that so little has been done to determine exactly what takes place in different parts of the firebox and boiler under various conditions of operation. Entirely too much energy has been expended in developing theories on this subject, most of which have been of very little practical benefit, and Mr. McBain is to be congratulated on confining his remarks almost entirely

to actual facts. The suggestion that the difference in the expansion of the inner and outer sheets of the firebox is due to the outer sheet being hotter is, of course, out of the question. In this connection L. R. Pomeroy called attention to the experiments made by A. E. Manchester, superintendent of motive power, Chicago, Milwaukee & St. Paul, which showed conclusively that fusible plugs placed near the inside sheets were subjected to a higher temperature than that due to the boiling water, indicating that the water was forced from contact with the sheet by the steam. A little over a year ago C. A. Seley, mechanical engineer, Chicago, Rock Island & Pacific, read a paper before the Western Railway Club in which he suggested that the failure of the straight side sheets of wide fireboxes might be due to the formation of a film of steam on the side sheet preventing its coming into direct contact with the water and thus becoming overheated. On the narrow firebox with the ogee sides this film of steam is swept away by the circulation of the water. It is true that the difficulties with the wide firebox have been overcome to some extent by the use of flexible staybolts. There are, however, many things about the action of the boiler that are not clearly understood, and much is to be desired in the direction of fewer failures and reduced maintenance costs. The experiments should be followed up by more elaborate ones, using the data obtained by Mr. McBain and others as a basis. The exact temperature of the sheets and of the water in various parts of the boiler could be accurately obtained by the use of pyrometers. These, including their installation, might cost \$500 or \$600, surely not more than \$1,000, and this expense would be repaid many times over by improvements which could be made in boiler design because of the information obtained.

VANDALIA RAILROAD.

The Vandalia gives the Pennsylvania its entrance into St. Louis. Of the total \$14,606,200 stock outstanding, on which the Vandalia is paying 5 per cent. dividends, the Pennsylvania Company owns \$11,633,400. In January, 1905, the Terre Haute & Indianapolis, the St. Louis, Vandalia & Toledo and the Indianapolis & Vincennes, all lines radiating from Indianapolis and Terre Haute, were consolidated as the Vandalia Railroad, but for some years before this the separate roads had been controlled by Pennsylvania interests and operated in harmony. In 1909 the company operated 827 miles of line.

Total operating revenue amounted to \$9,100,000 in the calendar year 1909, an increase of \$555,000 over 1908, almost the entire increase in revenue coming from increased freight earnings. Operating expenses, including taxes, amounted to \$7,100,000, an increase over 1908 of \$380,000. After the payment of fixed charges there was left net income of \$900,000 last year, comparing with \$740,000 the year before. Freight revenue, which forms 65 per cent. of total revenue, amounted last year to \$5,960,000. This is an increase of \$520,000 over the year before. The number of tons carried one mile in 1909 was 981,000,000, an increase over 1908 of 106 million, and the average revenue per ton per mile was 6.69 mills in 1909, which is less by 0.24 mills than in 1908. The average trainload last year was 313 tons, an increase of 21 tons over the year before.

Products of mines form 58 per cent. of the total tonnage carried by the Vandalia and last year the tonnage of these products amounted to 5,100,000 tons, an increase of 600,000 tons over 1908. Most of this tonnage was furnished by bituminous coal, of which product 4,500,000 tons were carried in 1909 as against 3,900,000 tons carried in 1908. Manufactures furnish 17 per cent. of the total tonnage and the tonnage of these products amounted to 1,500,000 tons in 1909 as against 1,300,000 tons in 1908.

As we have said, expenses were greater by \$380,000 in 1909 than in 1908. Almost the entire amount of this increase came through greater expenditures on maintenance of way and maintenance of equipment. These expenditures in 1909 were \$1,350,000 for maintenance of way and \$1,600,000 for maintenance of equipment, an increase of \$150,000 in maintenance of way and \$193,000 in maintenance of equipment. Transportation cost \$3,400,000, which was only very slightly (\$5,000) more than the cost in 1908. This good showing was made notwithstanding the fact that the total tonnage carried one mile increased over 13 per cent.

President Wood says: "The amount of high-class freight carried by your company necessitates the running of a large number of freight trains at comparatively high rates of speed, and as this business is increasing very rapidly and there are also a large number of very fast passenger trains, it will be necessary to proceed steadily with the double-tracking of your main line, of which 84 per cent. is still single track." In connection with the remark about fast passenger trains, it will be recalled that the Pennsylvania's 24-hour train between New York and St. Louis uses the Vandalia.

The general business depression of 1908 continued to affect the earnings of the Vandalia until about August, 1909, when improvement in business conditions set in, so that 1909 earnings do not show the effect of a full year of more prosperous business.

The following table shows the earnings and expenses in 1909 and 1908:

	1909.	1908.
Total mileage operated	827	829
Freight revenue	\$5,959,002	\$5,438,067
Passenger revenue	2,180,535	2,166,255
Total operating revenue	9,139,537	8,582,670
Maintenance of way	1,353,491	1,201,854
Maintenance of equipment	1,573,463	1,380,429
Traffic	281,105	256,116
Transportation	3,391,917	3,386,633
Total operating expenses	6,822,782	6,436,637
Taxes	286,500	292,500
Net operating income	2,027,004	1,853,533
Gross corporate income	2,057,835	1,876,797
Net corporate income	896,261	739,592
Dividends	730,308	729,570
Ex. exp., revising grades, etc.	150,000	.....
Surplus	15,954	10,022

DEPRECIATION RESERVES.

In another column we publish an article by Henry L. Gray, engineer of the Washington Railway Commission, entitled The Necessity of Depreciation Reserves. A good deal of attention recently has been given to the matter of maintaining depreciation accounts. The views expressed by Mr. Gray are interesting as those of an officer of a railway commission. In our issues of March 4, April 8 and May 20 we published interesting papers on the same general subject by C. I. Sturgis, general auditor of the Chicago, Burlington & Quincy, and William Mahl, vice-president of the Harriman Lines.

Mr. Gray implies the necessity of an annual charge equal to the estimated average annual depreciation. Admitting, for the purposes of this discussion, that the depreciation fund accumulated during a series of years should be sufficient to renew a plant when it has reached a certain depreciated condition, still it is not in accord with commercial usage to require that such total charge shall be distributed in equal annual or monthly amounts. Manufacturing establishments generally provide larger contributions to depreciation funds in "fat" than in "lean" years. The reason advanced for requiring a fixed monthly or annual charge is that it prevents unusual fluctuations in the accounts. Such fluctuations necessarily occur, however, between "fat" as compared with "lean" years, because in the former there are not only the expenses involved in carrying on a larger business but also larger earnings available for maintenance and repairs. Statisticians are too apt to try to reduce figures to a dead level instead of having them reflect the actual fluctuations caused by changes in conditions. It would seem to be more proper to have the figures reflect the conditions, and if desired, have

an explanation of the particular conditions influencing the current figures. It would seem to be best for the directors to decide how much shall be set aside for depreciation in each year, and if desired, state their reasons for deciding on a larger or smaller amount. The excessive tendency referred to, of statisticians to reduce figures to a dead level, is illustrated by the requirement of the New York Public Service Commission, mentioned by Mr. Gray for a depreciation fund which is really a combined maintenance and depreciation fund, as the commission intends it to be drawn on for all expenditure chargeable to the repair and renewal accounts.

Mr. Gray suggests charging to depreciation the "cost of rolling stock * * * distributed over a period corresponding to its probable life." But not only does the natural life of rolling stock and other parts of a railway plant vary with the geographical conditions and the size of each road, but it also varies in men's minds, each giving different stress to the various factors, such as demand for greater capacity, accidental destruction, change of type, etc.

Mr. Gray says that "in no case should a sum exceeding the original cost of the existing plant be charged against such (depreciation) fund." It may properly be held that it is not the original cost, but the estimated cost of replacement that should be the basis for a depreciation charge. We believe it may properly be contended that if a bridge wears out, it is the duty of the management to replace it with a bridge of like kind, regardless of the fact that the cost of steel may have gone up or down. It is a common practice (and a proper one) for a railway which is going to replace a steel bridge with a better one, to charge to maintenance what it would have cost to replace the old bridge in kind and to charge the excess cost of the new bridge to additions and betterments. Under Mr. Gray's plan the charge to maintenance would be the original cost of the bridge, and under this scheme in a case where the new bridge is no better than the old, there might be a considerable charge to additions and betterments because of the increased price of steel.

Mr. Gray talks about setting aside a "sum" and argues that it would not necessarily remain idle for a term of years. But if actual money were set aside, it would necessarily be idle and in some cases for a considerable period. But a depreciation fund is not, and ought not to be, a cash, but an expense account.

The aim of a railway management should be to so keep up the property out of earnings as to maintain its earning capacity and its capacity for giving good service to the public. So long as it does that it does its duty to its stockholders and to the public, and if its accounting system shows clearly that it has done its duty to its stockholders and to the public, and how it has done it, its accounting system is correct and should not be required to be so modified, in order to meet the views of theorists, that it will indicate what has not been done and ought not to have been done.

THE INCREASE OF DIVIDENDS.

Since January 1, 1910, twelve railway companies have raised their dividends, either in the form of an increase of the regular rate or as an extra cash payment. The list includes the New York Central, the Louisville & Nashville, the Reading, the Lake Shore and the Chesapeake & Ohio; and increases by other large corporations, notably the Pennsylvania Railroad, are credibly forecast as things of the near future. If these increases were simply a matter of the net earnings meeting a certain dividend requirement they would still have a fiscal interest as an index of the reaction from a period of industrial depression in which the railways had their share. For, taking the year 1908 as the 12 months of depression and the year next following as the one of recovery, the reaction upward must be deemed a remarkable one, contrasting dramatically with

the five years required for a similar recuperation after the panic of 1873. The optimists who call the panic of 1907 and its sequels a "rich man's" affair will see in the increased railway dividends of the last four months a confirmation of their oft-repeated theorem. And it is not surprising that the railway investor, not necessarily very optimistic, finds in these dividend increases his confidence in the railway security strengthened.

But quite apart from such personal equations the increase of dividends has one unique aspect. Such increases are normally coexistent not only with high railway earnings but with a period when prospective obstacles to the continuance of those earnings are at least minimized. Extra and increased dividends, in other words, have been declared usually under a clear sky and in fair weather; while now they are being paid not, to be sure, under a sky deeply overcast, but under a sky bearing some clouds. The increased earnings, gross and net, are here, but the wage question is not settled; the offsetting increase of rates has yet to be carried through; there is railway legislation pending in Congress, and two important decisions are hung up for a time in the United States Supreme Court but sure to come next autumn. Overhanging the situation also are the improvements, reduced during the depression and in many cases representing considerable outlays which have been postponed to an era of prosperity and larger traffic. Conditions such as these argue strongly for a conservative dividend policy and the delay of added returns to the stockholder, although his cry for them, oppressed as he is by his increased cost of living, is loud.

The side in favor of the dividend increases has, however, its plea. In some cases, notably that of the New York Central, the increased dividend is not so much an absolute increase as the return to an old rate temporarily interrupted. In a number of other cases the increase may fairly be called the partial reaping of a harvest which had nearly ripened when the panic period struck in. Such is the case of the Reading, long years in recovering from the policy of President Gowen and his great purchases of coal lands, but making good at last after dividends had failed for decades. In other cases there had been, preceding the panic period, the higher organization and improvements making for economies of operation which are now coming into play. Nor is it to be forgotten that the Pennsylvania Railroad has not yet increased its dividend, notwithstanding high earnings and the near approach of the time when the opening of its great New York terminal will fatten them. Wages must increase but the extensive and continuous negotiations are centering to the point where the railway managers know the upper limitations; the increase of rates is almost as sure as the increase of wages; new railway legislation in Congress is at its worst nebulous, both in form and consequences; and the highest federal tribunal, already divided, does not become more sinister with Governor Hughes on the supreme bench.

In the final analysis the question of an increased dividend reverts, obviously, to the fiscal condition of the particular railway corporation. A company like the Lackawanna, with vast accumulation of assets and small capital, can almost ignore—as in fact it has ignored—general railway situations and declare big dividends during industrial and commercial adversity. A railway corporation at the other extreme may, for special causes, be unable to sustain dividends even in a period of general prosperity. But in its secondary analysis the bearing of general conditions such as we have outlined becomes important and suggestive when the great group of railway dividend payers is taken collectively. That their presidents and directors have in so many cases voted for the dividend increase is, in itself, a note of confidence. They have personal as well as corporate reputations to sustain, and an occasional "dummy" director does not vitiate the whole board and still less does he impair—rather add to—the responsibility of the man who sits at the head of the table.

PITTSBURGH, CINCINNATI, CHICAGO & ST. LOUIS.

It has been pointed out that the Pan Handle performs much the same service for the Pennsylvania system as does the Big Four for the New York Central Lines. This is more or less true, but the fact that the Pennsylvania road runs between Pittsburgh and the Great Lakes, as well as forming a connection between the Pennsylvania Lines East and the cities of Cincinnati, Indianapolis and Louisville, gives it a character quite different from that of the Big Four.

The P. C. C. & St. L. operates the Southwest System of the Pennsylvania Lines West. Of the 1,469 miles operated in 1909 it owned 1,133 miles. The company does not control through stock ownership any very important lines of the Pennsylvania system. The greater part of its own stock is owned by the Pennsylvania Company, which operates the Northwest System of the Lines West, and is in turn controlled by the Pennsylvania Railroad. Such a road as the Pan Handle, serving Pittsburgh and the middle west, reflects in its own earnings very quickly and quite accurately the manufacturing prosperity or depression of the country. Naturally, therefore, in 1909 the road made a very good showing, for besides the better turn in business generally, the United States Steel Corporation's plant at Gary, Ind., was in operation and the effect of this was shown almost immediately in the earnings of the P. C. C. & St. L.

The opening of the Gary plant resulted in an immediate increase in the coal and coke tonnage from the West Virginia coal fields for the Gary and Chicago districts. In this connection it is worth remembering that the Western Maryland is now building a line from Cumberland, Md., north to Connelville to form a connection with the Pittsburgh & Lake Erie of the New York Central Lines, and when this line is built the New York Central and the Western Maryland will be able to compete with the Pennsylvania in hauling coal into Gary.

In 1909, total operating revenue of the P. C. C. & St. L. amounted to \$36,000,000. This is an increase of \$4,900,000 over 1908. Expenses, including taxes, amounted to \$25,900,000 last year and to \$22,500,000 the year before, an increase of \$3,400,000; so that net operating revenue were greater in 1909 than in 1908 by \$1,500,000 and totaled last year \$10,100,000. The revenue from freight was \$24,700,000 in 1909, or \$4,000,000 greater than in 1908, and the tonnage carried amounted to 32,900,000 tons, an increase of 21 per cent. The ton mileage increased 20 per cent., while the freight train mileage amounted to 10,500,000 miles, and was but 11 per cent. greater than in 1908. The average revenue per ton per mile amounted to 6.41 mills, a decrease of 0.03 mills from 1908, while the revenue per freight train mile amounted to \$2.36, an increase of 18 cents over 1908. The average train load was 368 tons, an increase of 30 tons over the average train load in 1908.

In 1909, 7 per cent. of the total tonnage carried was furnished by products of agriculture, 3 per cent. by products of animals, 55 per cent. by products of mines, 5 per cent. by products of forests, 26 per cent. by products of manufactures, 1 per cent. by merchandise and about 3 per cent. by miscellaneous articles. The tonnage of bituminous coal carried in 1909 total 12,500,000 tons, an increase of 1,700,000 tons. This is the largest increase shown in the tonnage of any commodity, but the largest percentage of increase is shown in the tonnage of bar and sheet metal, which tonnage amounted to 1,990,000 tons in 1909, an increase of 900,000 tons over 1908. The total tonnage of products of agriculture and also of products of animals was less in 1909 than in 1908.

Of the total increase in operating expenses, of \$3,400,000, \$1,700,000 was an increase in cost of maintenance of way, \$800,000 an increase in maintenance of equipment and \$800,000 an increase in cost of transportation; so that maintenance of way cost \$4,900,000 in 1909, maintenance of equipment cost \$6,200,000 and transportation expenses cost \$12,000,000.

The company borrowed from the Pennsylvania Company

\$2,000,000 during the year for advances for construction, making the total due the Pennsylvania Company by the P. C. C. & St. L. \$3,800,000. During the year the company increased its annual dividend rate on the common stock from 4 per cent. to 5 per cent., $4\frac{1}{2}$ per cent. being paid in 1909. On January 26, 1910, after the close of the fiscal year, an allotment of common stock aggregating \$7,015,600 was made to stockholders, both preferred and common, who were given the right to subscribe at par to the extent of $12\frac{1}{2}$ per cent. of their holdings. The money from this sale of stock is being used to pay off indebtedness and to pay for permanent improvements and additions to the property.

In order that the company may take care of the increasing traffic, both freight and passenger, resulting from the operation of the Gary plant, the directors have authorized grade revisions and double-tracking of 106 miles of single track line between Columbus and Chicago, and the revision of grades and double-tracking of 34 miles running from Richmond to Knightstown on the Indianapolis division. On the completion of the work now under way and to be undertaken in the near future the ruling grades between Chicago and Bradford will be 0.3 per cent., and between Columbus and Indianapolis will be 0.7 per cent.

In the nine months since the close of the fiscal year the company has earned operating income amounting to \$3,682,251. This is greater than the operating income for the corresponding nine months of 1908 by \$2,008,700.

The following table compares the results of operation in 1908 and 1909:

	1909.	1908.
Mileage operated	1,469	1,472
Freight revenue	\$24,706,600	\$20,659,359
Passenger revenue	7,240,853	6,839,918
Total operating revenue	35,970,833	31,075,098
Maintenance of way	4,928,406	3,215,225
Maintenance of equipment	6,172,357	5,343,686
Taxes	1,342,560	1,355,106
Transportation	11,996,129	11,204,436
Total operating expenses	23,575,158	21,170,637
Net operating income	10,053,115	8,549,355
*Gross corporate income	9,839,789	8,579,899
Net corporate income	5,488,641	4,042,870
Dividends	2,662,708	2,519,015
Extra. expenditures fund	1,600,000	385,000
†Surplus	107,116	71,133

*After the deduction of rentals paid roads operated on basis of net operating revenues.

†After the deduction of sinking fund contributions and payments on account of principal of car trusts.

THE CONTROVERSY OVER ADVANCES IN FREIGHT RATES.

Two years ago, when the railways were considering making numerous advances in freight rates, the shippers vigorously opposed it on the ground that this should not be done at a time of commercial depression. Their opposition was successful. Prosperity has now returned. The prices of materials and supplies are again rising. General increases in wages are being given to railway employees, most of them in pursuance of decisions of boards of arbitration representing the public. Again the railways propose to make advances in freight rates. And now the shippers oppose it because, as they argue, railway net earnings are increasing and the roads do not need higher rates. The theory that rates should not be raised in hard times because times are hard, and that they should not be raised in good times because times are good is convenient for the shippers but not wholly logical.

The question whether rates generally, or specific rates and schedules of rates, should be raised should not turn entirely, or perhaps even mainly, on the amount of the net earnings of the railways, past, present or prospective. The main point is not whether the *earnings* of the railways are reasonable, but whether their *rates* are fair and reasonable and would be rendered unfair and unreasonable by advances. We have never heard any shipper or industrial traffic manager having an expert knowledge of traffic affairs say he thought the rates of American railways as a whole are too high. We have heard many of them say they believe that on the average

they are too low. In the shippers' meeting at Chicago last week we saw shippers and representatives of shippers who concede in private conversation that many commodity rates are too low; most of them, however, ship on class rates. We saw there men who have told us that they believe many class rates are too low; most of them, however, ship on commodity rates. They were all there opposing advances in rates, not because they did not think that some advances would be justifiable, but because they did not want their own rates raised, whether justifiably or otherwise.

Those who admit that there ought to be some advances do so because as practical business men they recognize more or less clearly that railway rates—except those they pay themselves—ought to bear some fair proportion to the prices of commodities and the wages of labor. Now, measured in dollars and cents, there have been many reductions in rates and many advances during the past ten years. Meantime there have been many advances in the prices of commodities and the wages of labor and almost no reductions; and, after pending readjustments of wages are made, a ton-mile or a passenger mile of transportation will buy probably 40 per cent. less of labor and materials than it would ten years ago. Measured in money, railway rates have, on the average, remained about stationary; measured in the things bought with money they have greatly declined.

Moreover, everyone familiar with railway charges knows that there are in the tariffs many rates which were made in the days of cut-throat competition and rebating for the especial benefit of certain industries, or groups of industries, and which are so low as to be unfairly discriminatory. None but the beneficiaries of these rates will try to defend them. It is generally conceded that there ought to be a readjustment to eliminate them. Railway men contend that a general readjustment should be effected by advancing rates that are relatively low rather than by reducing rates that are relatively high. The implication of the argument of shippers, that the railways do not "need" higher rates, must be that discriminations should be eliminated by reductions rather than by advances. In fact, this is what some of them expressly contend.

The fact that net earnings are larger now than they were in the year of depression following the panic of 1907 can scarcely be accepted as demonstrating, as spokesmen of the shippers assume, that rates are high enough. Net earnings do not now equal the current rate of interest on the aggregate capitalization of the railways, or on what it probably would cost to reproduce their physical properties. How many of the business concerns represented at the shippers' meeting would agree that their prices were high enough if their profits were that small? Most of them would think they were doing very poorly if they earned less than 15 or 20 per cent.; and many of them earn much more. And the advances in wages which are being made threaten materially to reduce the already narrow margin of railway profit. At the shippers' meeting one of the speakers denied and ridiculed a statement that the aggregate advance in wages would amount to \$100,000,000, basing his opinion on the aggregate wages paid in 1908. The total wages paid by railways in that year were \$1,051,632,225, an average of \$721 per employee. The number of employees was 1,458,244, or 213,830 less than in 1907. Assuming that the railways have now as many employees as they had in 1907; that until the recent advances in wages they were paying them on the average as much as they did in 1908; and that the advances in wages being made will average 8 per cent., the aggregate increase in wages will be \$96,445,000. This is 25 per cent. of the total amount of dividends declared in 1908. The same speaker asserted that the average advance in rates will be 15 per cent. The advances in all rates made or in contemplation, would not average even one-third of 15 per cent. on the entire traffic, for no advances have been made or are contemplated on a large part of the traffic. Now, an increase

of 5 per cent. over the freight earnings in 1909 would amount to but \$84,000,000, and an advance of 7 per cent. to but \$118,000,000.

The shippers demand that the reasonableness of past and proposed advances in rates shall be submitted to arbitration by the Interstate Commerce Commission. If they and the commission will agree to arbitration on a fair basis, the roads might be justified in accepting their proposition. But if an arbitration agreement were made, it should provide that the commission should not consider merely whether both earnings and expenses are increasing, and how much, but whether each of the higher rates and schedules of rates is, or will be, excessive in proportion to the value of the service rendered for it, and in proportion to other rates, and whether the result of the advances will be, not that the railways will be enabled to earn a trifle more than the current rate of interest, but that they will be enabled to earn profits excessive as compared with those earned by other industries. The determining of this latter point would involve full and frank disclosure by the various shippers of the profit they are making. It should be agreed that if it should be found that the higher rates would impose no undue burden on commerce and were not adapted to yield railways profits disproportionate to those earned in other industries, the decision of the arbitrators should be in favor of the advances.

If the shippers will not agree to submit their case to the commission on fair terms the roads would much better refuse arbitration. No doubt the shippers would then go to the courts for injunctions to restrain collection of the advanced rates until their reasonableness could be determined by the commission. In that event the roads could appeal to the courts from an unsatisfactory decision of the commission, while if they voluntarily submit the question to arbitration they would be bound to abide by its results. If the shippers will not arbitrate under conditions they would be willing to have applied to their own businesses, the roads would better fight out definitely and finally the question of their right to adjust their rates with a reasonable regard to their own interests as well as to those of the shippers.

NEW BOOKS.

Patent Laws of the World. By John P. O'Donnell, 57 Palace Chambers, Westminster, S. W., London. Price 2s. 6d.

This is the fifth edition of Mr. O'Donnell's well-known synopsis of the patent laws of all countries. Following the brief chapter of general information, the principal points of interest to a applicant are given in a uniform arrangement under each country. The British patent law of 1907, which came into force two years ago and which allows the revocation of a patent if the article is not made in Great Britain, is summarized at considerable length.

Official List of Open and Prepay Stations. No. 4.—A list of freight stations on the railways of the United States, Canada and Mexico. St. Louis, Mo.: F. A. Leland, Agent, Century Building.

This fourth issue of this useful work brings the information down to April 15, 1910, and, as heretofore, supplements will be issued on the first and fifteenth of each month, the supplements being consolidated so that not more than three will be in effect at any time. The book, which fills 284 pages, shows, in two lists, one alphabetical and the other geographical, the names of all stations, with notes to indicate whether or not there is an agent in charge, whether freight must be prepaid, and such other special information as is usually found in freight tariffs. These bits of special information, which naturally would take the form of foot-notes, are brought together in the front of the book, and they fill 15 pages. In some cases these notes are given in apparently excessive detail. For instance, all freight billed to a certain station in the state of Pennsylvania must be prepaid, except carload shipments to certain parties, and the names of these parties—

42 of them—are all given in full. The book printed a year ago contained the stations on 450 railways; in the present issue there are many more. We have not taken the pains to count them, but the publisher informs us that the book contains all stations on all railways in the United States, Canada and Mexico, "with very few exceptions." The work is filed with the Interstate Commerce Commission, the same as a tariff would be, the publisher having secured legal authority from each of the roads represented, and it is approved by the Interstate Commerce Commission. No railway is shown in the book except by proper authority, and each of the companies participating in the publication obligates itself to furnish the publisher promptly with notices of all station changes.

Letters to the Editor.

PRESSURE ON RETAINING WALLS DUE TO FROST.

Washington, D. C., May 10, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In connection with the discussion in your issue of April 15, on A New Theory for Earth Pressure, it occurs to me that engineers neglect in designing retaining walls to consider the effect of pressure due to frost, which greatly increases the lateral thrust during the winter. A consideration of retaining wall failures will show they are chiefly the result of frost stresses. Another formidable agency in the destruction of these walls is ground water. This coadjutor of frost not only increases the normal earth thrust, but, hindered from egress by the face of the wall, percolates downward, softening the foundation soil. During winter, ground water escaping through outlets usually provided is frozen and seals the outlets. The hydraulic head increases until the water flows over the top, or escapes beneath the wall. If the failure of the wall is not so conspicuous as to necessitate rebuilding, there are two remedies that will delay further injury.

(1) Substitute for the earth surface of the embankment a concrete pavement extending back from the wall several feet, on an up-slope and edge it into the embankment, below frostline if practicable, and let this pavement extend an unbroken surface over the top of the wall to its outer edge. This pavement should be reinforced in order to bridge over the earth surface adjoining the wall or settlement of the embankment will crack it and let surface water through to the inner face of the wall. Beneath the pavement should be a foot of gravel or stone.

(2) Enlarge ground water openings and have no metal outlets. During dry weather when there is no frost run a tile drain near the outer face of the wall as deep as the bottom of the foundation, if practicable, connecting at intervals with sewer or other outlet. This is unnecessary in a sandy substratum. The trench may be refilled with concrete, if adjacent to the wall, or piling may be driven at intervals along the line of the wall a foot or two from its face, and a tile drain constructed. For new construction; if subsurface drainage is available, the tile drain should be laid and connected near the inner face of the wall.

As a general proposition, retaining walls are costly and uncertain structures when exposed to frost and ground water, and should not be constructed unless unavoidable.

In cities, when necessary to elevate or depress tracks with permanent structures, a reinforced concrete storage building or hollow wall should be constructed on the site of the proposed wall. This building may be substituted for the entire embankment, or for so much of it as the demand or use for storage and the unit cost of concrete and of embankment will justify. Pages of theory may be written on earth pressure and walls designed and constructed with a factor of safety

which in the course of a year may be lost by hydraulic pressure combined with frost thrust. There is an example near Washington of a long retaining wall, 25 ft. high, built at extravagant cost where there was space to construct the preferable and usual-embankment slope.

The proper way to design a retaining wall, when exposed to frost, is to figure a proper thickness for earth pressure, add a proper thickness for hydraulic head, of one-half height of wall, and horizontal frost-thrust against the upper tenth of the inner face of the wall equal to a hydraulic head of one-tenth the height of the wall, plus 10 ft. The extravagant cost of retaining walls, if thus designed, should discourage their use. Dry storage space for ties and other timber along railway lines is sufficiently valuable to justify engineers in substituting for solid retaining walls, whenever possible, a concrete building that will retain the embankment securely and provide a structure at less cost and of some utility.

R. H. PHILLIPS, C. E.

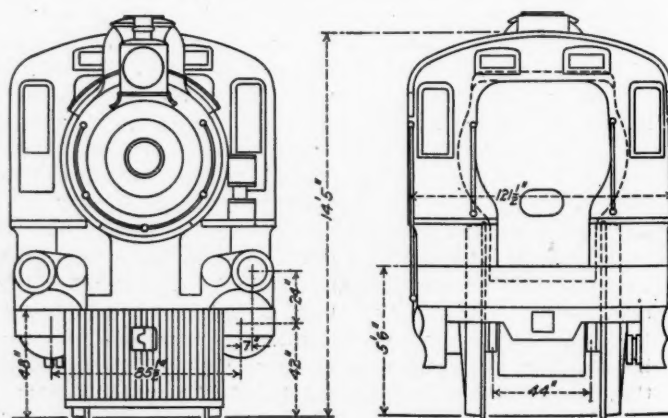
[Two methods have been adopted for centuries to minimize the effect of frost action on retaining walls, and both have proved satisfactory when used with intelligence. The first method is to make the wall heavier than would be demanded by ordinary conditions; the second is to lessen the top thickness by a short slope at the back of the wall in order that the forward thrust may be diverted upward. The importance of drainage is insisted on by all men of experience and when walls fail because of inadequate provision for drainage the designer is at fault. The idea of substituting buildings is not new; its feasibility is largely dependent on cost and the value of the land thus occupied. The rear walls of such buildings must necessarily be retaining walls, or the structures may be viaducts, and there is nothing but excessive cost to hinder the construction of viaducts designed to permit the use of the space under the deck. This, in fact, has been done in many places, but the question of cost is paramount and thus leads to the building of retaining walls where otherwise excellent opportunities exist for the provision of storage space. Retaining walls have been used so long that the percentage of failures is really small and the cause of such failure is generally the lack of provision for proper drainage.—EDITOR.]

LIMITED SPEED OF PASSENGER LOCOMOTIVES.

Brooklyn, N. Y., March 23, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I have read with a great deal of interest the discussion in recent issues of the *Railway Age Gazette* regarding the



End Elevations of Proposed American Type Locomotive.

limited speed of passenger locomotives, and, like Mr. Fry, think that the modern express engine is humiliated to a great extent. Numerous examples can be cited which would show that rather heavy trains are frequently hauled by Atlantic

type engines which maintain a speed above sixty miles an hour for considerable distances; as, for example, some of the trains on the Pennsylvania. For example, the Pennsylvania Special (the eighteen-hour train to Chicago) is scheduled to regularly make the run from Jersey City to North Philadelphia, 84 miles, in 83 minutes, and the engine doing this work is, or was until recently, No. 10, a class E-3d which, as is well known, is an Atlantic type engine having 22-in. x 26-in. cylinders, 80-in. drivers and a total weight of 188,600 lbs.

This discussion has prompted a train of thought in my mind along somewhat different lines: For many years the standard express engine in this country was the American, or eight-wheel type, and the latest designs of this type of engine were the Pennsylvania, class D-16a of 1895, and the New York Central, class L-3; the former has 18½-in. x 26-in. cylinders, 80-in. drivers, steam pressure of 185 lbs., total weight on driving wheels of 91,600 lbs. (about 250 of these were built). The latter has 19-in. x 24-in. cylinders, 77-in. drivers, steam pressure 200 lbs., 94,400 lbs. on driving wheels. These engines were very efficient until the trains became too heavy.

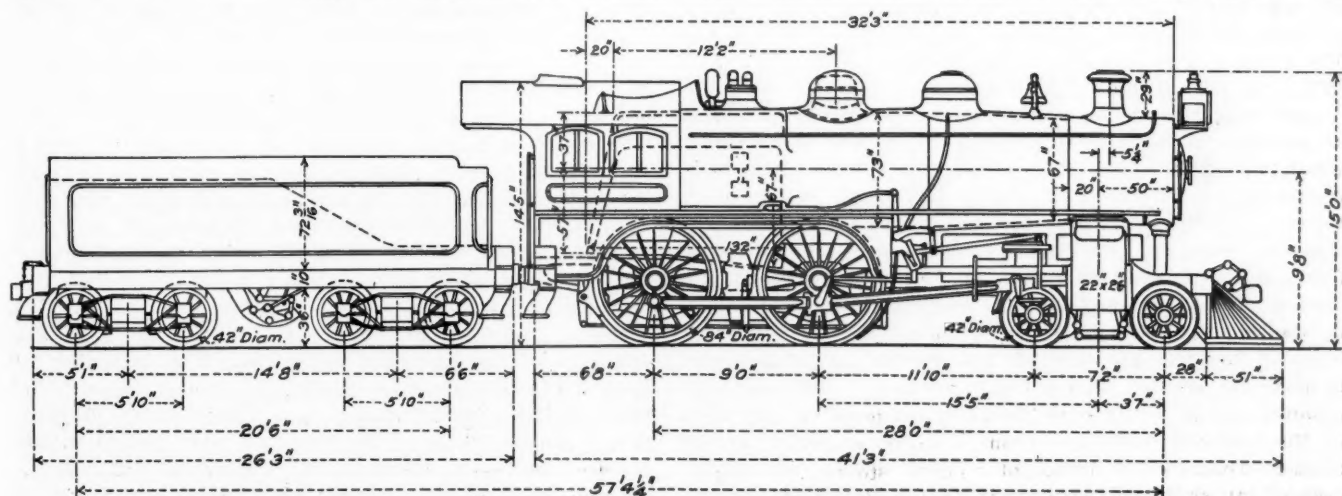
It is generally conceded that the American type engine

subject considerable thought, and the question has arisen—was the eight-wheel engine abandoned too soon? The eight-wheel was probably our most flexible engine as regards design. In considering the question, I have prepared a sketch of the American type engine with the proportions of the Atlantic type, the sketch and general dimension being submitted herewith, and the following points will be noted: The boiler is very high, being 9 ft. 8 in. to the center, which is 3 in. less than the height to the center of the boiler on the Pennsylvania, class K-28, Pacific engine; the connecting rod is very long, being 11 ft., which is several inches less in length than the connecting rod of the Pennsylvania Atlantic engine; the firebox, being narrow, may be criticised, and yet the Milwaukee road has some efficient engines of the Atlantic and Pacific types having narrow boxes. The sketch shows an ordinary two-cylinder engine with Walschaert's valve gear, but the flexibility of the eight-wheel design would admit of the application of three cylinders, or four cylinders balanced, more readily and with less complication than can be applied to Atlantic or Pacific types, due mainly to the greater distance between the cylinder saddle and forward drivers; for more than two cylinders on the latter type of engines necessitate either a bifurcated connecting rod as in the Vauclain

	N. Y. C. & H. R.	Penn. R.R.	N. Y. C. & H. R.	C. M. & St. P.	Penn. R.R.	L. S. & M. S.	Penn. R.R.	Experim't'l design.
Locomotive	No. 947	No. 1651	No. 3000	No. 951	No. 10	No. 4724	No. 7067	
Class	I-3.	D-16a.			E-3-d.		K-28.	
Type	4-4-0	4-4-0	4-4-2	4-4-2	4-4-2	2-6-2	4-6-2	4-4-0
Built by	R.R. Co.	R.R. Co.	Schenectady	Baldwin	R.R. Co.	Brooks	Pittsburgh.	
Built in year	1895.	1895.	1904.	1905.	1905.	1905.	1907.	
Cylinders	19x24 in.	18½x26 in.	15½x26x26	15.25x28	22 x 26 in.	21½x28 in.	24 x 26 in.	22 x 26 in.
Drivers, diameter	77 in.	80 in.	79 in.	85 in.	80 in.	79 in.	80 in.	84 in.
Length of main rod	7 ft. 8¾ in.	40 in.	75¼ in.	60 in.	11 ft. 5½ in.	73¼ in.	10 ft. 5 in.	11 ft. 0 in.
Firebox, inside width	119½ in.	119½ in.	96¼ in.	107 in.	111 in.	108 in.	111 in.	122 in.
Firebox, inside length	364	310	390	268	315	322	343	315
Tubes, number	2 in.	1½ in.	2 in.	2¼ in.	2 in.	2¼ in.	2¼ in.	2 in.
Heating surface, tubes	2,224 sq. ft.	1,746.6 sq. ft.	16 ft. 0 in.	19 ft. 0 in.	15 ft. 0 in.	19 ft. 6 in.	21 ft. 0 in.	16 ft. 0 in.
“ firebox	180	171.4	3,008 sq. ft.	3,008 sq. ft.	2,474 sq. ft.	3,678 sq. ft.	4,222 sq. ft.	2,638 sq. ft.
“ total	2,404	1,918	3,446 sq. ft.	3,194	2,640	3,905	4,427	2,818
Grate area	30.7	33	50.3	45	55.5	55	61.8	34
Weight on drivers	94,400 lbs.	91,600 lbs.	121,600 lbs.	105,966 lbs.	109,033 lbs.	170,000 lbs.	183,900 lbs.	120,000 lbs.
Weight, total	146,400 lbs.	134,800 lbs.	200,000 lbs.	204,119 lbs.	176,600 lbs.	245,000 lbs.	272,500 lbs.	180,000 lbs.
Boiler, min. inside diameter	65 in.	60 in.	72¼ in.	66 in.	67 in.	70 in.	79¾ in.	67 in.
“ height to center	8 ft. 11½ in.	8 ft. 11½ in.	9 ft. 3¾ in.	9 ft. 6 in.	9 ft. 3¾ in.	9 ft. 6 in.	9 ft. 11 in.	9 ft. 8 in.
“ working steam pressure	200 lbs.	185 lbs.	220	220	205	200	205	205
Driving wheel base	8 ft. 6 in.	7 ft. 9 in.	7 ft. 0 in.	7 ft. 6 in.	7 ft. 5 in.	14 ft. 0 in.	13 ft. 10 in.	9 ft. 0 in.
Distance c. of rear driver to c. of trailer	23 ft. 8 in.	22 ft. 9½ in.	9 ft. 6 in.	27 ft. 9 in.	11 ft. 8 in.	10 ft. 11 in.	10 ft. 0 in.	
Total wheel base, engine	112.52 lbs.	111.24 lbs.	29 ft. 9 in.	32 ft. 2 in.	30 ft. 9½ in.	34 ft. 3 in.	35 ft. 2½ in.	28 ft. 0 in.
Tractive effort per lb. of M. E. P.	18,003 lbs.	16,464 lbs.			157.30 lbs.	148.95 lbs.	187.20 lbs.	149.81 lbs.
Tractive effort, total					25,797 lbs.	23,832 lbs.	30,701 lbs.	24,569 lbs.

was abandoned for high speed work in order that an engine might be designed providing a wider grate and a heavier weight on the driving wheels, and the Atlantic type of engine was the result. After the Atlantic type became

type, or inside cylinders projecting beyond the outer ones as in the Cole type. On the other hand, in the refinement of design of the eight-wheel engine the application of three or four cylinders would permit of their being placed in the



Proposed Design of American Type Locomotive for Heavy High Speed Passenger Service.

popular, we began to have boilers having very long tubes and other dimensions greatly in excess of anything ever attempted in the eight-wheel type.

The writer does not wish to retrograde, but has given the

same position, viz., between the truck wheels, and all would drive on the forward axle and guides, cross-heads and connecting rods would be identical for all the cylinders.

Inasmuch as in the future locomotive, lines of development

must be such as to provide a very refined valve gear resulting in high efficiency in steam consumption, and as this probably means more than two cylinders, it is obvious that with but one kind of connecting rod, etc., for all cylinders, the complications of three or four cylinders will be greatly reduced; in fact, almost as little as in an ordinary two-cylinder engine, and an eight-wheel engine having but four axles does, of course, develop less internal friction than is found in Atlantic and Pacific types with their additional axles.

General Dimensions.

Weight on drivers	120,000 lbs.
" on truck	60,000 "
" total	180,000 "
" tender	132,500 "
" engine and tender	312,500 "
Valve gear	Walschaert
Main rod, length	11 ft.
Boller, type	Belpaire, sloping top
Firebox, width and length	40 x 122 in.
Tubes, number and diameter	315; 2-in.
Tubes, length	16 ft.
Heating surface, firebox	180 sq. ft.
" tubes	2,638 "
" total	2,818 "
Grate area	33.8 "
Tender, capacity, coal	11 tons
Tender capacity, water	5,500 gals.

It is the writer's firm conviction that a very efficient engine could be designed along the lines herein set forth, and such an engine would undoubtedly attain very high speed with a train within its capacity, say, not exceeding six or eight cars.

The table on the preceding page compares the more important dimensions of several typical modern express engines with the design referred to above.

C. B. CHANEY, JR.

Contributed Papers.

AMERICAN RAILWAY ASSOCIATION.

The spring session of the American Railway Association was held in New York May 18 with an attendance of 150. The executive committee announced the delegation to the International Railway Congress on behalf of the association, as given in our last issue, namely, the president, the general secretary and the general agent, J. F. Wallace, Kansas City, Mexico & Orient; William Mahl, Union Pacific; Charles W. Bradley, Western New York Car Demurrage Association; W. J. Harahan, Erie, and Geo. L. Connor, former passenger traffic manager of the New York, New Haven & Hartford.

The committee on maintenance has under consideration the questions of the conservation and growth of timber by the railways and of boiler inspection, but only reported progress. The number of freight cars fitted with air brakes January 1, 1910, was 2,208,210 out of a total in service of 2,235,553.

The committee on relations between railroads presented an amendment to Rule 11 of the Code of Per Diem Rules, which was adopted, to take effect July 1 next. This rule regulates the settlement of claims for errors in per diem reports. As revised, it provides that demands for corrections shall be presented after four months and within one year from the last day of the month in which the per diem was earned. The former provision for continuance of negotiations is retained, but the privilege of continuance shall cease if a claimant neglects his case for six months. Provision also is made for keeping alive a claim where per diem has been reported to the wrong road, and also for suitable correction of the accounts when per diem has been reported to the right road but for the wrong car. These changes were recommended by the Association of Transportation & Car Accounting Officers.

The committee presented a Code of Switching Reclaim Rules, which was adopted.

The association adopted a resolution requesting members to advise the Association of Transportation and Car Accounting

Officers of all difficulties which have arisen from car marking. That association has a committee which is striving to promote simplicity and uniformity. Also said association was requested to keep a record of the marking of freight cars and to suggest changes, reporting progress to the American Railway Association.

The committee recommended a number of amendments to the instructions that go with the National Code of Car Demurrage Rules, and these were adopted.

In connection with the committee's report interesting statistics were presented showing the progress made in the improvement of the interchange reports, also a summary of the statistics of freight car balance and performances, car surpluses and shortages which are regularly given in the *Railway Age Gazette*.

The committee also stated that it had rendered an interpretation on Car Service Rule 14, covering the empty movement of tank cars, which was adopted by the association, as follows:

Question—From what date should mileage be counted to obtain balance required at end of first accounting period?

Answer—From the date when the first tariff filed with the Interstate Commerce Commission took effect, which provided for equalization of loaded and empty mileage and payment for excess empty mileage, even if such tariff did not include all the details of Car Service Rule 14.

The committee on the safe transportation of explosives made a report in which was included its minute on the death of Dr. C. B. Dudley, president of the bureau, which occurred on December 21, 1909. The minute reads in part:

In the death of its president, this bureau has sustained an irreparable loss that is shared by all of the important organizations of scientific and professional men of which he was a member, and by the railway service of this country of which he was a distinguished ornament.

His activities in promoting the safe transportation of dangerous articles extended over a period of twenty years, and he was head of a committee of experts which presented a most complete and able report that laid the foundation of the structure upon which the regulations for the safe transportation of explosives were formulated. His life was an example of loyalty, industry and integrity, and he had an encouraging and elevating optimism.

Theodore Voorhees (P. & R.) has been elected chairman of the committee and president of the bureau of explosives. Several amendments to the Regulations for the Transportation of Explosives and Inflammable Articles as recommended by the committee were adopted, as also a uniform code of rules covering precautions necessary in handling wrecks involving oil cars.

The committee on electrical working, George Gibbs chairman, has not yet had time to gather the necessary data for making a report on the present status of electric traction on steam railways nor to formulate standards for electrical devices, but recommends members to read the report made by Mr. Gibbs for the International Railway Congress, published in the Bulletin of the Congress for January, and the report prepared for the New York Railroad Club in April. Attention is called to the fact that the standards for third-rail working conductors, presented by the committee in September, 1907, and March, 1908, are in all probability very nearly what will be finally adopted, and therefore it is time to withdraw objections. If every road tries to provide for its special equipment an agreement will never be reached.

Daniel Willard was elected president and H. U. Mudge first vice-president; and Messrs. C. R. Gray and I. G. Rawn members of the executive committee. The following were elected members of the committee on transportation: Baltimore & Ohio Southwestern; New York Central & Hudson River; Union Pacific. The following were elected members of the committee on maintenance: Chicago & North Western; Chicago, Rock Island & Pacific; Philadelphia & Reading. The following were elected members of the committee on relations between railways: Chicago, Milwaukee & St. Paul; Illinois Central; Southern.

The association decided to hold its next meeting in St. Louis November 17, 1910.

THE NECESSITY OF DEPRECIATION RESERVES.

BY HENRY L. GRAY, ASSOC. M., A. S. C. E.,
Engineer, Railroad Commission of Washington.

Depreciation of railway property consists of a lessening in value or a death of the capital invested in such property. It may be due to wear and tear, such as the wearing out of an integral part of a plant; to obsolescence, or the replacement of a serviceable machine by one of a later type; to inadequacy, or the replacement of a smaller machine with a larger; and to public demand, such as the elevation or depression of tracks, required by ordinance. Whenever a component part of a plant is removed from the service and sold or scrapped, that part of the plant has depreciated the full amount possible.

As the fundamental principle of investment is that capital shall remain unimpaired, it follows that with the death of capital provision must be made to renew the plant when it has reached a certain depreciated condition, and, as the different parts depreciate at different rates, the amount of money expended for depreciation will vary with the years, sometimes being small and sometimes large; and as the actual yearly amount necessary to be paid out for depreciation cannot be accurately anticipated, a certain sum should annually be placed in a depreciation reserve which will provide for expenditures for depreciation during any year and keep the plant in first-class condition. Such annual charge is just as important an item of expense as is the cost of conducting transportation; in case that such accounts are not maintained and the annual net revenue distributed in the form of dividends, each stockholder is virtually presented with a small portion of the plant; and such dividends do the added harm of causing the public to invest in stocks on the face of the returns, unaware of the day of reckoning that awaits.

Unless it may be considered that bond sinking funds correspond to depreciation funds, it may be said that it has not been the practice of steam and electric railways to maintain depreciation reserves, all replacements due to depreciation being charged to repairs and renewals, which has had the effect of frequently "bunching" the heavy expenditures and unbalancing operating expenses. Had such expenditures been made from a fund accumulating through a period of years, each year would bear its proportionate part of the burden, operating expenses would not fluctuate to such a marked extent, and it would not be necessary to await the "fat" years before making much-needed replacements. It is now recognized that such depreciation reserves are not only legitimate but highly necessary, the Interstate Commerce Commission and several state commissions providing for depreciation accounts.

It is difficult to distinguish between "depreciation" and "maintenance," authorities differing as to just what items of expense should be paid for from the depreciation fund. The New York Public Service Commission, Second District, provides for a depreciation fund, which is really a combined maintenance and depreciation fund, as it intends drawing upon it for all expenditures chargeable to the repair and renewal accounts. In the case of the Wisconsin Railroad Commission vs. the Milwaukee Ry. & Light Co., many expert witnesses testified in regard as to what should be considered as depreciation, their opinions ranging from that of Professor Cooley, who considered that all major repairs and renewals should be paid from the depreciation fund, to that of Mr. Olds, superintendent of rolling stock, who considered that all repairs should be charged to maintenance and only the replacement of the component parts of a system, such as cars, generators, etc., should be charged to depreciation. This latter view coincides with that of the Interstate Commerce Commission, which body, though silent in regard to the depreciation of way and structures, clearly provides that in the case of equipment the cost of the rolling stock shall be distributed over a period corresponding to its probable life, and that charges to depreciation shall cease when the original cost

shall have been charged off. Prior to the issuance of the recent instructions by the Interstate Commerce Commission the general opinion seemed to incline toward charging all renewals and a certain portion of repairs to depreciation. This view is incorrect and not consistent with the proper use of such funds.

The line between the depreciation account and the maintenance account should be closely drawn, in order to avoid endless trouble for the accounting department. In setting up a depreciation fund the plant should be divided into its component parts, the different units paid for, such as rails, generators, ties, locomotives, cars, wire, boilers, etc., the more complete the itemization the more correct the result; the probable life of each unit should be ascertained, the possible scrap value assumed and the annual depreciation determined by dividing the cost, less scrap value, by the probable life. The sum of the depreciation of the individual items will represent the annual depreciation of the plant, and against this fund should be charged the cost of the different units, less scrap value, as they are replaced. Any increase or decrease in the cost of new parts should be charged or credited to capital, and the depreciative reserve modified accordingly; and in no case should a sum exceeding the original cost of the existing plant be charged against such fund. For example, all new ties placed in the road should be charged to depreciation, excepting ties replacing those destroyed by accidents, and the same would apply to rails and fastenings. The renewal of a commutator should be charged to maintenance, but should the entire generator be scrapped or abandoned the new generator would be paid for from the reserve. The replacement of a wheel or axle of a car, or a set of grate bars of a locomotive would also be charged to maintenance. In fact, a piece of equipment might be repaired to such an extent that there would be but little of the original left, and all of such repairs should be charged to maintenance; but it is highly probable that long before this point was reached it would have become uneconomical to repair it further, and it would be abandoned and charged to depreciation. The painting or shingling of a building should be charged to maintenance, but should the building be torn down and a new one built, a sum representing the cost of the old building would be provided from the depreciation fund. Should such a building burn down, that portion of the depreciation fund which related to such a building should be used in replacing the structure, but the remainder should be charged to maintenance. Accidents are not due to depreciation and should not be paid for from the reserve, nor should such a fund ever be called on to provide for repairs.

The life and annual depreciation of the several elements of a railway depend upon the location, climate, character of material and use. Under the same traffic a tie should last longer in the dry climate of Arizona than in the wet climate of Puget Sound, but rails should last longer in the latter, owing to the absence of sand. A frame building will have a shorter life in western Oregon than in Colorado, but the annual depreciation in dollars will not be greater owing to the smaller cost. While every railway system will practically require a different set of mortality tables, yet they will not vary greatly. The following table is used by the writer for the state of Washington, and is approximately correct for that state. Items which are not considered as being subject to depreciation are omitted. In fact, however, there is no element of a railway which does not depreciate excepting real estate, and perhaps the grade, but, as with steel bridges, the depreciation in many cases is so small it is almost negligible.

Item.	Per ct. annual depreciation.
Ballast	8
Ties	15
Rails (main track)	3
Fastenings	5
Frogs and switches	7
Plank paving	8
Track laying	5
Timber tunnel lining	8
Combination bridges	6

Item.	Per ct. annual depreciation.
Howe truss bridges	10
Pile and frame bridges	10
Wooden culverts	10
Crossings and signs	8
Fences and cattle guards	8
Telephone and telegraph instruments	6
Poles and fixtures	8
Covered copper feeder	2
Trolley wire	5
Rail bonds	3
Brick buildings	2
Frame buildings	3
Shop machinery	6
Water and fuel stations	4
Roadway tools	10
Interlocking and signal apparatus	7
Substation apparatus	5
Storage batteries	15
Furniture and fixtures	3
Passenger cars, steam	3
Passenger cars, electric	5
Freight cars, steam	4
Freight cars, electric	4
Steam locomotives	3
Electric equipment of cars	5

Many street and electric railway systems have practised setting aside a certain portion of the gross earnings each year to cover "maintenance and depreciation," but there has been little effort to distinguish between the two accounts. The ordinances of the city of Chicago permit the street railway companies to so set aside 14 per cent. of the gross earnings each year, 6 per cent. to cover maintenance and 8 per cent. to cover depreciation, but this is considered by many to be too small an allowance. In the Milwaukee rate case previously referred to, Mr. Beggs, president of the Milwaukee company, stated that a total allowance of 15 per cent. of the gross earnings would be ample to take care of maintenance and depreciation for his company. Professor Cooley considered that 24 per cent. would be sufficient to cover maintenance and the depreciation due to wear and tear, but would not cover obsolescence nor inadequacy. Stone & Webster, in their connection with the street railways of Chicago, recommended in two cases that 21.77 per cent. and 23.70 per cent. of the gross earnings should be set aside, and in their testimony before the Railroad Commission of Washington stated that 25 per cent. was an ample allowance. Mr. Gore, the accountant retained by the city of Milwaukee, recommended 16.5 per cent. as the annual allowance to cover maintenance and depreciation, while Mr. Caffin, of the United States Securities Co., considered that 17 per cent. was a fair proportion and would be about equally divided between maintenance and depreciation.

From 1900 to 1908 the average yearly expenditure for maintenance and depreciation by the railways of the United States was 27.74 per cent. of the gross earnings from operation, having been 13.58 per cent. for maintenance of way and structures and 14.16 per cent. for maintenance of equipment. It should be noted that maintenance of equipment has gradually increased until it exceeds maintenance of way and structures.

While depreciation bears a rather vague relation to the gross earnings, inasmuch as the more business a road does the more property it will own, and the more depreciation there will be, yet it is evident that any attempt to provide for a depreciation fund on a basis of gross earnings is illogical, and, although it may be based upon the past experience of the older roads, it would be but a crude method for a new road to adopt. The proper method, that of ascertaining the life of the capital invested in the plant, and setting aside each year a sum which will replace the plant when it is worn out, is not only logical but easily worked out. It does not indicate that the fund should remain idle for a term of years, as it would be constantly drawn on, as only the average life of the elements of the plant can be ascertained, and such average lives range from a few years to twenty or thirty years. In the case of street railways much testimony has been given as to the percentage of the cost of such systems to be annually set aside to cover depreciation, but the different authorities vary widely, owing somewhat to a difference of opinion as to what constitutes depreciation. In the previously mentioned Milwaukee case, Mr. Starrett, an electrical

authority, who included a certain amount of major repairs in the charge to depreciation, would allow 7.88 per cent., considering 5.59 per cent. due to wear and tear, 1.79 per cent. due to obsolescence, and 0.5 per cent. due to inadequacy. Professor Cooley would allow 7.67 per cent., while the heads of departments of the Milwaukee Railway & Light Co. agreed upon 6.68 per cent., both of the last including major repairs. Stone & Webster, in the two Chicago cases, specified 5.59 per cent. and 5.68 per cent. Dickson, Wilmot & Steritt, accountants, specified 5.37 per cent., while Foster's Handbook informs us that 3 per cent. of the cost of plant should be set aside annually to cover renewals.

All of the above percentages are based upon the cost of plant; a false premise at best, as such cost might include large expenditures for real estate and grading, two items which appreciate rather than depreciate. But they are probably not much affected by these two items, for, as a rule, street railway companies do not own expensive terminals and the grading is not heavy, but in the case of steam roads the cost of plant would be greatly different from the cost of property subject to depreciation. The above percentages also include a certain amount of repairs, which in a way destroys their comparative value.

The writer has just completed the appraisal of an electric road in Washington, the Puget Sound Electric Railway, having 64 miles of track, which was practically at its period of maximum depreciation, and afforded great opportunity for study. It was found that the annual depreciation was 5.47 per cent. of the cost of property subject to depreciation, but only 2.64 per cent. of the total cost of plant. This line maintains over seven miles of pile bridges, which depreciate rapidly in the wet climate of western Washington (which climate is also very hard on equipment), but also uses the third rail system, which depreciates but little, so that it may be said that the figure of 5.47 per cent. is rational. In the case of the steam roads of Washington, appraised in 1906, it was found that the annual depreciation on the Oregon Railway & Navigation Co.'s lines was 4.74 per cent. of the cost of the property subject to depreciation, and 2.49 per cent. of the total cost of plant, while the annual depreciation on the Great Northern lines was 4.48 per cent. in the one case and only 1.63 per cent. in the other. The first two percentages substantially agree, the difference between the last two being due to the fact that the Great Northern owns extensive terminals in the state, while the Oregon Railway & Navigation Co. does not. These two roads are fairly representative of the railways of the United States, their total expenditures for maintenance and depreciation for 1906 being 22.5 per cent. and 21.1 per cent. of the gross earnings, and their construction is of a permanent character.

The laws of Washington require the railway commission to ascertain not only the cost of reproduction, but also the depreciated value and market value of the railways within the state, and the writer, working in this connection, has given the subject of depreciation considerable study, and has reached the following conclusions: (1) That depreciation is a term separate and distinct from maintenance, and includes obsolescence and inadequacy, and excludes repairs. (2) That a depreciation fund should be maintained to insure the life of the capital invested. (3) That a depreciation fund should be based upon the cost of property subject to depreciation. (4) That the percentage of annual depreciation in terms of the cost of property subject to depreciation is greater for electric roads than for steam roads. (5) That a fair average annual allowance for depreciation on steam roads would be 5½ per cent. of the cost of property subject to depreciation; for electric roads 6½ per cent., and for street railways, where construction is more permanent, 5 per cent. (6) That if the average annual expenditure due to depreciation is so determined, and such a sum be placed each year in the depreciation reserve, it will not be excessive, and will be sufficient to maintain the capital unimpaired.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.

The second annual meeting of the International Railway Fuel Association was held at the La Salle hotel, Chicago, May 23-26. Eugene McAuliffe, general fuel agent, Rock Island, presided. The first morning session was occupied by routine business and the reading of the secretary's and treasurer's reports; the association has 300 members and a balance of \$696 in the treasury.

S. L. Yerkes submitted a report on "Character of Membership That Should Be Encouraged in the Association." He said in part: "The fuel bill of the railways of the United States represents in round numbers \$300,000,000 per annum, including the cost of the movement from the mines to points of consumption, and for unloading from cars through fueling plants to locomotive tenders. Of every dollar earned by our roads, approximately 12 cents is paid out for fuel. Any association, therefore, that has to deal with railway fuel and its consumption has a broad and important field to cover.

"While this association is primarily a railway association, yet it was decided at the organization meeting in November, 1908, to ask the coal producer and representatives of engineering firms manufacturing fuel-handling devices to join as associate members, and the results already secured by the co-operation on the part of the associate membership show that the step was a wise one.

"From the railway standpoint we want as members of our association all men responsible in any way for railway fuel. The fuel agent or purchasing agent who does the buying combines his knowledge of operation and economics with that of the fuel inspector who is on the ground at points of production and fully conversant with the conditions that effect purchases, adding to both the experience of the men who make a study of fuel-handling devices.

"We want the engineer of tests, who can answer from a technical standpoint as to the uses various coals can be put to; we want the mining engineer, who, on such lines as are coal producers, assists so largely in the preparation of coal; we want the accountant, whose knowledge of costs is so important to the man at the head of the fuel department; we want the traveling engineer and the traveling fireman, whose work with the apprentice fireman means so much in the size of the coal bill.

"The coal operator as the producer is an important factor in economy. To-day coal represents the largest tonnage handled by the railways, and it is also the most widely scattered. To serve the best interests of both buyer and producer they must work together to overcome the problems which the coal producer has to meet at certain seasons and in certain districts. Closer contact of the buyer and producer as brought about through this association will surely bring results.

"The representatives of firms manufacturing fuel-handling devices are important members of this association. These men are specialists and we want the benefit of their advice on the question of economical handling of fuel.

"Our association is a year and a half old. The membership has increased from 35 at the organization meeting to over 300 at the present time."

Methods of Supervision, Instruction and Encouragement in Locomotive Operation to Secure the Greatest Efficiency in Fuel Consumption.—The report was read by the chairman, D. Meadows, Michigan Central. It gives replies to questions and circulars sent out, with little discussion or definite opinion of the committee. The principal replies to the questions are as follows: "The supervision of fuel economy is generally looked after by the road foreman of engines and his assistants." Most members advise both class and individual instruction, but emphasize the superior value of the latter. Most roads have a progressive system of examination for firemen which includes fuel economy. The reports indicate that individual

locomotive performance sheets are not made out on the majority of roads. In regard to premiums or prizes as an incentive to engineers to improve and maintain a good fuel record, all replies show that no such system is now employed, the impression being that it would tend to make the engineers dishonest. All agree that the most vital essential in fuel economy, outside the purchasing price, consists in keeping the engine in thorough repair; eliminating all leaks, blows and waste of steam; having ample grate area and heating surface; having good facilities for caring for power; enginemen trained to burn the fuel economically; avoiding unnecessary delays, and securing the quality of coal as specified in the contract. Following is an abstract of the latter part of the report:

A number of roads keep inspectors at the mines, who closely watch the loading of coal into the cars, see that cars are properly cleaned before being placed under the tippie, the inspector having authority to reject all cars which contain a high percentage of non-combustible matter, slack, etc. Those reporting in favor of inspectors at the mines claim that they receive a better grade of coal, due to this inspection, also a better loading of cars, thus requiring less cars to haul the same tonnage. It is claimed that the cost of inspection at the mines is more than balanced by the better grade of fuel received. The majority of roads do not employ inspectors at the mines but put it up to the coal company to see that the coal is properly prepared and cleaned. It would appear that the latter method is the wiser. All coal companies employ experienced men to supervise the loading of cars, and throw out any impurities, bone coal, etc., that may have passed the men in the mine. This being a fact, why should it not be up to the coal company to deliver a grade of coal suitable to the contract or requirements of the contractor? Assuming that a railway uses 1,000,000 tons of coal a year, which is a small average estimate, at one-fourth cent per ton for inspection at the mines, the inspection will cost \$2,500, a large sum to expend in looking after what should legitimately be done by the producer.

The inspectors for some railways must inspect the coal from a number of mines, and as these are often a considerable distance apart, it follows that while they are watching the loading at one mine the work is being neglected at another. You can form but a very poor opinion of the coal from the appearance of the top of the car, more particularly if it is loaded with run of mine coal. The top of a car of run of mine coal looks about as good as one loaded with coal that has passed over a commercial screen. This is due to the methods followed in loading.

We believe that greater economy will be effected by the railway consumer, contracting for a certain class or grade of coal, instructing its coal dock foremen as to the quality of coal contracted for, and holding all cars that do not come up to standard. The company's inspector should occasionally visit the mines and watch the preparation of the coal. He then will be in a position to say if the coal company is honestly trying to prepare and deliver the quality of coal contracted for.

The committee believes that in selecting coal, railways should be guided by practical tests, or in other words, should select a certain engine and assign it to a certain service, this service to compare with ordinary service on that division; weigh the coal, calibrate the tank, so as to know in pounds or gallons the amount of water used each trip, and figure the evaporation results from that data. Select the coal that shows the greatest evaporation per dollar of cost. We believe this will be much more satisfactory than a laboratory test intended to determine its calorific value and its chemical constituents.

All railways should endeavor to select a certain or suitable grade of coal, assign it to a certain territory and have it definitely understood that no change will be made except in grave emergency. This will enable the mechanical department to draft the engines to obtain the best results from the fuel, rather than having to draft the engines to burn the poorer

class of fuel to the detriment or waste of other classes. Enginemen also will become familiar with the fuel used and handle it more economically.

Coal should be placed on the tender of engines in such size that the fireman can devote his entire time and attention to feeding it to the fire. If the lumps are larger than 3 in. square, whether the firemen break these lumps or not, a certain amount of coal is wasted. The better coal is prepared before being placed on the tender the more economical its use will be.

A locomotive performance sheet showing consumption in pounds per ton mile per hour would create a rivalry among the enginemen that would bring about good results. A performance sheet showing the engine miles made per ton of coal is not worth the paper it is written on, and a sheet on the ton or thousand ton mile basis is very little better. None of these are of value if there is not some fairly accurate method of determining the amount of coal used by each engineman each trip. At the present time most roads run their engines in what is called "the pool." An engineer takes one engine from the home terminal and returns on another, and probably changes firemen half way over the division. The coal is put on the engine by a man who receives a small wage and who has no other aim in connection with his work than to properly coal the engine and have his accounts straight at the end of each week or month. He has full authority to say how much coal the tender will hold, and should he be short of checks for coal given out, immediately proceeds to make checks for more coal than he puts on the engine. This may appear to some as an exaggeration, but we believe it is the practice on the majority of roads in America. Under such conditions a comparative sheet of any kind is valueless, and the time of the office man consumed in making out this report might better be used in some more profitable work. Some roads, however, weigh the coal put on tenders, or have some fairly accurate way of measuring it. On these roads a performance sheet based on the ton mile per hour basis puts into the hands of the master mechanic or road foreman something fairly accurate and reliable, from which they can select the weak, careless or inefficient men and put them in a way of doing better. It also will assist the road foreman in locating engines that need attention.

The supervision of coal placed on tenders and the performance obtained from the use of this coal is not given anything like the attention it deserves. Until some accurate method of knowing how much coal is put on tenders, what percentage of it is consumed at the engine house, also some accurate method of determining the amount of work done for the coal consumed is arrived at, the desired results can scarcely be expected.

Methods of Purchasing Fuel with Regard to Traffic Conditions and Producer's Interests.—This committee, W. H. Huff, chairman, urged closer co-operation between the railway fuel agent and the mine operator. The fuel agent who couples with his coal contract a regulated activity in the direction of supplying cars to the mines is the miner's good Samaritan and his own best friend. Spasmodic efforts are unavailing, unbusinesslike and a positive detriment to the railway and coal producer alike. Inattention to the coal supply until it becomes acute, and over-attention until it equals congestion, are evils of railroading well worth considering. The committee believed that there is a common ground upon which the railway and the coal producer can meet. Neither can prosper without the other, therefore they should give proper regard to each other's interests.

Kindling Locomotive Fires.—C. F. Richardson submitted a report on this subject, from which the following is taken:

The most satisfactory method of firing up locomotives is that of using fuel oil, either a safe crude or refinery residuum, for saturating ordinary mill shop shavings or borings. Under this plan the grates are bedded over with coal to a depth of 3 or 4 in. and two bushels of oil-saturated shavings are spread over the top. The shavings are ignited by throwing into the

firebox a small handful of burning waste, the oil contained in the shavings furnishing sufficient fuel of rapid and quick igniting quality and thoroughly igniting the coal before the shavings are consumed.

In order to prepare for the use of fuel oil and shavings a small building or condemned box car should be installed in a convenient place for the storage of dry shavings; in one end of this structure a metal box should be placed for use in mixing the material. For an average-size roundhouse a steel box 2½ ft. wide by 2½ ft. deep, and from 6 ft. to 8 ft. in length will usually hold a sufficient amount of shavings to take care of the fires required for one shift of twelve hours. The shavings should be shoveled into the mixing box and the oil be poured over them; they should be thoroughly mixed with a rake or shovel. It is necessary and advisable to install a small steam coil underneath the metal box to keep the oil warm and in a fluid state; the expense for the coil and the steam is more than offset by the saving in fuel oil used, the warm oil more thoroughly saturating the shavings with the result that only half as much oil will be used as compared with the amount necessary when no heating arrangements are provided. In average practice 3 gallons of oil will be required per locomotive fire built to saturate the necessary amount of shavings, and the cost of oil varying from possibly 1½ cent to 3 cents per gallon delivered, the expense incident to securing shavings is usually nominal.

In computing the expense of firing up locomotives the steam used for blower purposes should be taken into account; it has been demonstrated that less blowing is required with oil and shavings than with wood or with the oil atomizer. A number of tests have been made demonstrating that the coal required to build a fire from wood is equal to that where oil and shavings are made use of, it being evident that the heat units obtained from the combustion of the wood are practically lost, this due to the fact that large volumes of cold air pass through the grates as the result of uneven ignition.

In portions of the cotton raising country cotton seed hulls have been substituted for shavings with good effect, the hulls being saturated in the same manner as shavings, and applied on top of the coal in the firebox. In portions of the southwest a number of tests have demonstrated that fires can be built from fuel oil and hulls at a cost of 7½ cents per fire, the hulls costing \$5 per ton f. o. b. cars.

It is the opinion of the committee that except in the case of roads operating in a territory where wood is plentiful and where the number of locomotives handled is not sufficient to justify the installation necessary for the use of oil and shavings, the use of wood should be abandoned. From an operating standpoint fires built under the plan outlined leave the terminal in a much better condition than when built through the medium of either wood or oil atomizers.

Grade of Fuel Most Suitable for Locomotive Use, Considering Cost Per Unit of Traffic and Best Interests of Producer.—J. G. Crawford, chairman of the committee, reported in part as follows: This subject was considered from the standpoint of a railway being supplied with bituminous coal from mines on its own line. The case of a road supplied with coal from mines located on other lines is similar except for the fact that it is unnecessary for it to take as much interest in the welfare of the coal operator. From the standpoint of the operating department of a railway the most desirable coals are those which cost the least per ton-mile, including the f. o. b. mine, cost of haulage, cost of handling at chutes, cost of firebox repairs, cost of handling ashes, cost of delays to trains caused by poor coal and all other points directly and indirectly affecting the cost of coal per ton-mile, not limiting the cost of coal per ton-mile to such costs ordinarily charged in operating statistics.

For the best interests of the railway and the coal operators the most suitable coals to use are those the purchase of which causes the net earnings of both the railway and the coal operators to be at a minimum. It is believed that by proper

co-operation the net earnings of both the railway and operators can be at a maximum and that it is not necessary for the net earnings of the coal operators to be below maximum in order that the railway make maximum net earnings, the prosperity of both a railway and its coal operators being interdependent.

Granting the above to be the case it may be necessary for the railway to purchase coal—

1. From mines producing coal of quality undesirable to the motive power department.

2. From mines whose cost of production necessitates that the selling price be higher than that of other available coals which increases the cost of coal per ton-mile.

3. Of other than the size desired by the motive power department.

For the best interests of all concerned the coal will therefore be supplied from several mining districts and by a large number of mines. Under these circumstances it will not be uncommon for a large railway to be purchasing coal of 30 per cent. range in heat value. Where coals of widely different character or heat value are used it is not advisable to use them indiscriminately but to keep them grouped so that an engine district will receive only one character of coal; this will require two kinds of coal to be kept only at the chutes at division points separating engine districts using coals of different character. This factor should be considered in determining the tonnage of coals to be used so that it will not be necessary at times to send coal of 70 per cent. rank into a district regularly supplied with 100 per cent. coal.

As a general proposition there do not seem to be sufficient advantages to offset the disadvantages of supplying passenger engines with lump coal and engines in other service with mine run. It is desirable to keep a uniform grade as well as a uniform character of coal in an engine district. There are probably some cases where it is necessary to furnish passenger engines with lump coal, while freight engines in the same territory are using mine run, but this should only be done to avoid possible engine failures resulting from poor coal.

The results of only one test bearing on the evaporative efficiencies of different sizes of coal from the same mine have been furnished and they are given below. The analysis and B. T. U. determination based on mine samples is as follows:

	Per cent.
Moisture	13
Volatile matter	35
Fixed carbon	41
Ash	11
Total	100
Sulphur	4
British thermal units	11,300

The coals tested were $\frac{3}{4}$ in. and $1\frac{1}{4}$ in. lump made over a bar screen, the former prepared by the removal as screenings of 27 per cent. of the mine run hoisted and the latter by the removal of 38 per cent. of the mine run hoisted. Over 200 tons of each of these coals were used on the same engine hauling the same trains, and the difference between the two coals was 1 per cent. and that in favor of the $\frac{3}{4}$ -in. coal, thus proving that both coals were of equal evaporative value. The cost of the $1\frac{1}{4}$ -in. coal would have been at least 10 cents more per ton, yet it gave no greater evaporative value nor could a more uniform steam pressure be maintained with it than with the $\frac{3}{4}$ -in. lump.

Coal high in slack requires a smaller tip to produce the stronger draft. This means more back pressure.

We believe that the tendency is to exaggerate the detrimental effect of slack in locomotive coal.

An article in the *Railway Age Gazette* of April 22, 1910, page 1049, gives results of tests made on the Wheeling & Lake Erie, mine run and $\frac{3}{4}$ -in. lump coal being tested under similar conditions. The results of these tests showed that the $\frac{3}{4}$ -in. lump had 5.6 per cent. greater evaporative value than the mine run.

The results of the two cases cited show the importance of every railway knowing the locomotive evaporative value (not the laboratory calorimeter value) of every important grade of

coal from every important mining district which is supplying or which might supply coal. It is only when this knowledge is at hand that a railway can tell whether it is purchasing the most economical size of coal from each district and whether or not it would be economy to increase the tonnage from some districts and decrease the amount taken from others. The difference between the cost of fuel purchased on a basis of mutual interest to the railway company as a whole and the coal operators, and the cost of fuel as it might be purchased to the best interests of the motive power department should be known. This difference is rightly chargeable to the cost of obtaining freight and passenger traffic, though under present accounting systems the motive power department is charged with it and the cost of coal per ton-mile is increased.

The foregoing refers to locomotive coal, but stationary boiler coal, though costing only a small percentage of the amount paid for locomotive fuel is, nevertheless, an item of importance. Little attention is given to stationary boiler coal, and many plants are using high-grade coal, though the remodeling of the boiler plants to use slack coal would pay good interest on the investment. From both the standpoint of the railway and the coal operators stationary boiler plants should be equipped to burn slack coal, thus helping the operators to some extent when there is a surplus of screenings being made at the mines. Using screenings at boiler plants, especially outlying ones, does away with the loss of coal by theft.

Coal should be broken to the proper size before being put on the tender. From the standpoint of preparation egg coal is ideal, as it requires no breaking at the chutes, but only a limited quantity of this coal is available. Where hard, flinty coals are used some type of mechanical breaker should be used, thus reducing the cost of handling through coaling plants and insuring proper preparation, which results in fuel economy.

Standard Uniform Blanks for Reporting All Items of Cost of the Handling of All Railway Fuel.—The committee, N. M. Rice, chairman, believes that three forms can be arranged to require the minimum amount of clerical work, and at the same time furnish all necessary information. The first form is entitled "Daily Fuel Station Report." It is to be filled out by the day foreman at each fuel station and mailed to the officer in charge of the fuel department at the close of each day. The second blank is intended to furnish exact information as to how each chute is operated from day to day, and to permit the average operation for any number of days to be quickly obtained. Upon the entry on the last day of the month the report is completed without any further accounting. This report may be arranged to be made out in triplicate or otherwise, and copies may be forwarded to the officers interested immediately upon receipt of the last daily report. The third blank suggested is one by means of which comparison between stations of the different types can be made.

Mechanical Preparation of Coal.—H. H. Stoek, professor of mining engineering, University of Illinois, read a paper on this subject, an abstract of which follows:

The mechanical preparation of coal refers to the treatment to which such fuel is subjected in order to prepare it for use. This preparation includes sizing, washing, coking and briquetting.

The mechanical treatment of coal aims to size it so that it may be burned to better advantage and to increase the relative amounts of the fuel constituents, fixed carbon and volatiles, by decreasing the non-fuel elements such as moisture and ash, and to decrease the deleterious elements—sulphur and phosphorus.

The moisture in coal occurs:

1. In the essential composition of the coal, and this part cannot be removed, except by heating the coal to a temperature of 212 deg.

2. Coal may hold moisture just as a sponge holds water, and the amount of this moisture depends largely upon weather conditions and the way in which the coal is stored. In a damp climate coal left exposed to the air will mechanically absorb

a considerable amount of water, while in a dry climate the mechanically held water will be given off. Except in the case of washed coal, coal is seldom treated for the specific purpose of removing the moisture, except as it is stored in piles and thus allowed to dry out by exposure to the atmosphere. Many coals, however, when thus stored give off gases that have a fuel value and disintegrate so that the decrease in fuel value thereby is greater than any gain through the elimination of moisture by drying.

Sizing of Coal.—For many years the only treatment to which bituminous coal was subjected was to dump it over inclined bars which separated the very fine material called slack from the lump coal, and in many cases even this amount of screening was not done and the coal was shipped run-of-mine. Although this method still prevails to a considerable extent, a large amount of bituminous coal is now sized and some of the most recent tipples contain appliances for separating seven or eight sizes.

The object of sizing coal is to secure a product that can be burned more advantageously than unsized coal. A compact coal that contains but little volatile matter burns on the surface and the combustion extends gradually inward. Hence it is advantageous to have lumps of approximately equal size so that the air can reach the surface of the coal as uniformly and as readily as possible, for if large and small lumps are mixed the passageways for the air between the large lumps are stopped by the small lumps and the burning of the coal thus interfered with. It is not practicable to size very soft coals, such as Connelville or Pocahontas, and, moreover, there is not the same necessity since the coking in the furnace soon destroys the effect of the sizing. However, even with such coals, a large lump mixed with fine coal will lie practically dead for a long time and must be broken up in the furnace to secure the most effective burning. Thus far, there has been very little breaking of bituminous coal in order merely to size it for fuel purposes to supply a demand for certain sizes. Coal is, however, crushed before coking and is broken and sized before washing to secure the best results. The time may come when bituminous coal will be broken to secure certain sizes just as is done with anthracite; in fact, certain tipples recently built have crushers installed for this purpose looking toward the necessities of the future.

The sizing of coal is done in one of two ways:

1. By inclined bars.
2. By screens which may be (a) revolving or (b) shaking.

In the agreement between the coal operators and the United Mine Workers the standard screen is a series of inclined bars over which the run-of-mine coal is dumped. These screens separate the lump from the slack or screenings. The agreement in regard to these screens made in 1898 and generally still used in the territory specified is as follows:

"Screens hereby adopted for the state of Ohio, Western Pennsylvania and the bituminous district of Indiana shall be uniform in size, 6 ft. wide by 12 ft. long, built of flat or acorn-shaped bars of not less than $\frac{5}{8}$ in. surface, with $1\frac{1}{4}$ in. between bars, free from obstructions, and such screens shall rest upon a sufficient number of bars to hold the bars in proper position."

Except for the sizes prepared on these standard bar screens there is a wide variation in the sizes of bituminous coal in different localities and there is no uniformity or standard in regard to either names or sizes in different states or even in different parts of the same state.

In Pennsylvania and Ohio, though the nut coal screen usually has a $\frac{3}{4}$ -in. space between the bars, a $\frac{5}{8}$ -in. space is frequently used. The term pea coal is applied to the size passing over $\frac{5}{8}$ -in., $\frac{1}{2}$ -in. and $\frac{3}{8}$ -in. mesh, and where this size is made the material passing through the screen is slack. In some parts of Pennsylvania anything passing through a $\frac{3}{4}$ -in. screen is called slack, while in other sections of the same state anything passing through $\frac{1}{4}$ in. is slack. In fact, the terms slack and lump are absolutely indefinite—slack means usually the

smallest size shipped from any given plant and lump the largest size.

Illinois has not only taken the lead in the screening and marketing of unwashed coal, but she is also the leader in the washing of coal for steam and fuel purposes. The practice in regard to the screening of washed coal in Illinois is quite largely followed in the few washeries built in other neighboring states where washing is done for steam and fuel purposes.

The washeries in these states commonly prepare five sizes of coal, although some few prepare only three and a few washeries prepare seven. Where the five sizes are made they are numbered as follows:

No. 1 coal through.....	3 to $1\frac{3}{4}$ inches
" 2 "	$1\frac{3}{4}$ " 1 " "
" 3 "	1 " $\frac{3}{4}$ " "
" 4 "	$\frac{3}{4}$ " $\frac{1}{4}$ " "
" 5 "	$\frac{1}{4}$ " 0 " "

These last two sizes have to be separated by the use of a spray of water on the screens. In fact, water spray is often used on the sizing screens for all the different sizes, as it not only facilitates sizing but gives the coal a brighter and cleaner appearance for the market.

Cleaning of Coal.—The cleaning of coal should begin in the mine, and in general and as far as possible the impurities should be separated there by hand, thus decreasing the amount of useless material hauled and hoisted to the surface. It is not always possible for the operator to secure the amount of cleaning that he desires in the mine, and, moreover, with the poor light in the mine it is impossible to clean the coal as thoroughly as can be done on the surface. At present over 50 per cent. of the coal mined in the United States is shot off the solid, and even where the coal is undercut by machines an excessive amount of powder is used. Solid shooting, too much powder, and payment on the run-of-mine basis result in an excessive amount of fine and dirty coal, and complicate the coal cleaning problem of the mine operator.

Coal Washing.—The principal method of purifying bituminous coals is by washing.

The technical meaning of coal washing is a separation of impurities from the coal due to a difference in the specific gravity, and it does not mean merely a washing off by a spray of water of the mud or refuse adhering to the surface, although this latter use of the term sometimes is found.

The object of washing coal is two-fold:

1. To reduce the amount of ash in the coal intended for fuel purposes and thus to increase its fuel value.
2. To reduce the amount of sulphur in a coal intended for coking so that a coke can be made which will be usable in the manufacture of iron. At the same time certain amounts of ash producing impurities are removed, but the prime object is usually the removal of the sulphur.

Coal is a comparatively cheap material that must be handled in large quantities, quickly and at a minimum of expense. Hence, while the same general principles apply to the washing of coal as to the concentration of ores, the selling price of coal will not usually permit the cost for equipment or treatment that is possible with the more valuable ores. The principle underlying all coal washing machinery depends upon the difference in specific gravity between coal and the impurities mixed with it. The average specific gravity of coal and of the materials which must be considered in connection with the washing of coal are as follows:

Coal.	Ash forming impurities.	Sulphur sources.
Anthracite.....1.5		Iron pyrites.....4.2
Bituminous.....1.25-1.35	Shale.....1.60	Calcium sulphate.2.32
	Slate.....2.10	
	Fireclay.....1.90	

If a mixture of pieces of coal, slate and pyrites of approximately the same size be agitated in water and then allowed to settle, the heaviest, which is the pyrites, will go to the bottom, the next heavier, or the slate, will settle on top of the pyrites and the lightest, or the coal, will be on top of the slate or may even float on top of the water. A piece of coal 1 in. in diameter, a piece of slate 1.6 in. in diameter and a piece of pyrites 1-12 in. in diameter will weigh the same, and

falling in water will settle in about the same stratum, and if there is this difference in the relative sizes of the pieces of the three materials there will be little or no separation of them. The more nearly the particles of the different materials are of the same size the more readily can they be separated. If it were merely a question of separating pure pyrites and pure slate from pure coal the problem would be comparatively simple, but it must be borne in mind that the slate merges gradually into bone coal, and the bone coal in turn merges gradually into coal, and these may be mixed in any proportions. Furthermore, pyrites, instead of being pure and occurring in lumps or balls by itself, may be finely divided and mixed throughout the coal. If this happens to be the case, a separation by washing is practically unattainable.

It is usually necessary in washing any particular material to establish an arbitrary distinction between coal, bone coal and slate, as for instance, to call everything coal having a specific gravity of less than 1.35, everything between 1.35 and 1.45 or 1.50 bone coal, and everything having a higher gravity, slate. Coal is broken preparatory to washing it in an ordinary toothed roll, and then sized either in revolving screens or shaker screens, or in an hydraulic classifier.

Machines used for washing coal are classed under four general heads:

1. Trough washers, of which the Scaife is an example.
2. Inverted cone washers like the Jeffrey.
3. Bumping tables like the Campbell.
4. Jigs, of which there are a large number of different types.

The cost of washing coal varies widely in different localities, and in Illinois alone, figures have been furnished the writer varying from \$0.02½ to \$0.20 a ton. It has been impossible from the data at hand to prepare a statement of the costs under differing conditions that would be of value. Many quote their costs as simply the labor employed in the washing without including the interest on their investment and the depreciation of the plant. A cost of \$0.10 per ton will apply in a number of Illinois plants.

Until quite recently, the coal washing industry in the United States could be said to be in an experimental state, owing to the fact that there was such a great amount of high-grade coal in the Appalachian and other coal regions that could be marketed and coked without preliminary washing. As the coal fields have been more extensively developed, and as competition between districts has become more keen, and also since the Connellsville region is being rapidly exhausted, the demand for washed coal both for domestic and coking purposes, has increased. Another item which has given an impetus to the coal washing industry is the extensive introduction of late years of by-product coke ovens. The use of these ovens renders it possible to coke coal which cannot be coked in the bee-hive oven. It has also been demonstrated that it is possible to coke certain coal after washing which cannot be successfully coked before washing, on account of the large amount of impurities contained. The low-grade coals of the Rocky Mountain states can be greatly improved by washing, and many of them can be coked only after they have first gone through the washing process.

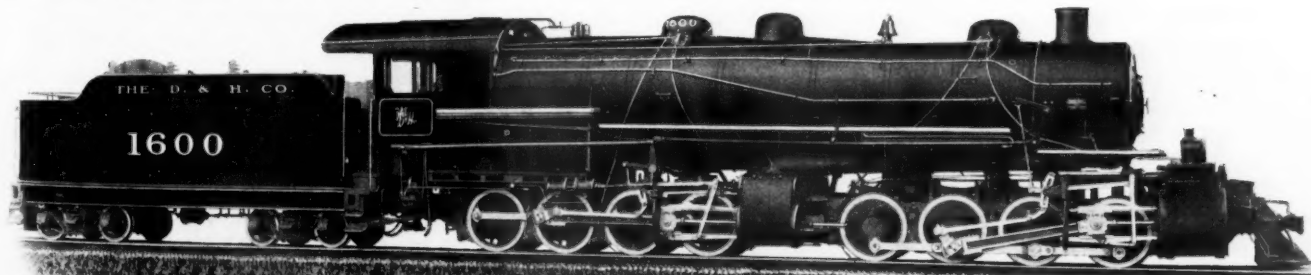
Illinois is the chief center of coal washing for domestic purposes. In Alabama, the coal is washed mainly as preliminary to coking, and in Pennsylvania it is washed both for coking and domestic purposes. There are a few washeries in Montana and Washington, where the coal is washed for railway use, although thus far there has not been much demand on the part of the railways for washed coal.

Not all coal can be washed successfully or economically, and coal washing is by no means the panacea for all the ills of the coal market that some enthusiastic advocates would have us believe, but that the industry has a future and that the problem is worthy of the closest study of engineers we are assured. It must be borne in mind, however, that each coal washing proposition is a distinct problem, and that there is no universal coal washing process or machinery. Each problem must be separately studied and extensive laboratory tests made before an expensive plant is erected, for by such examinations and tests it is generally possible to say whether a certain coal can be washed and thereby rendered fit for a specific purpose. There are reliable firms of engineers who specialize along this line and have testing laboratories for making such preliminary tests.

Coking of Coal.—The introduction of by-product ovens has given an interest in the subject to many connected with mechanical pursuits because most of these by-product plants are located in large cities and many of them have been established with a view to utilizing for fuel or illuminating purposes the gaseous products which are wasted in the ordinary bee-hive oven.

MALLET ARTICULATED COMPOUND LOCOMOTIVE FOR THE DELAWARE & HUDSON CO.

Six of the most powerful locomotives ever built have recently been delivered to the Delaware & Hudson Co. by the American Locomotive Co. They are designed for pusher service over a portion of the Wilkesbarre and Susquehanna division of the road. The division extends from Carbondale, Pa., to Oneonta, N. Y., a distance of 95 miles. The movement of heavy traffic over this division is northbound, and it is for this work on a heavy grade out of Carbondale that the engines are to be used. The traffic is made up for the most part of loaded coal trains and at the start there is a six-mile grade of from 1.363 to 0.68 per cent. Starting out of Carbondale the grade rises at a rate of from 1.36 to 1.363 per cent. for a little more than five miles. It then eases off and ranges from 0.63 to 0.88 per cent. for a little less than 14 miles. The total rise in the 19 miles is 945 ft. or at an average of about 0.94 per cent, not compensated. In addition to the grade, the road is very crooked, having 83 curves of from 1 deg. to 6 deg. 30 min. As a whole, these curves average about 5 deg. It will be seen that the run is over an exceedingly difficult piece of track. Having passed the summit, the road drops down into Oneonta, a distance of about 75 miles, on a fairly even grade of about 1 per cent.



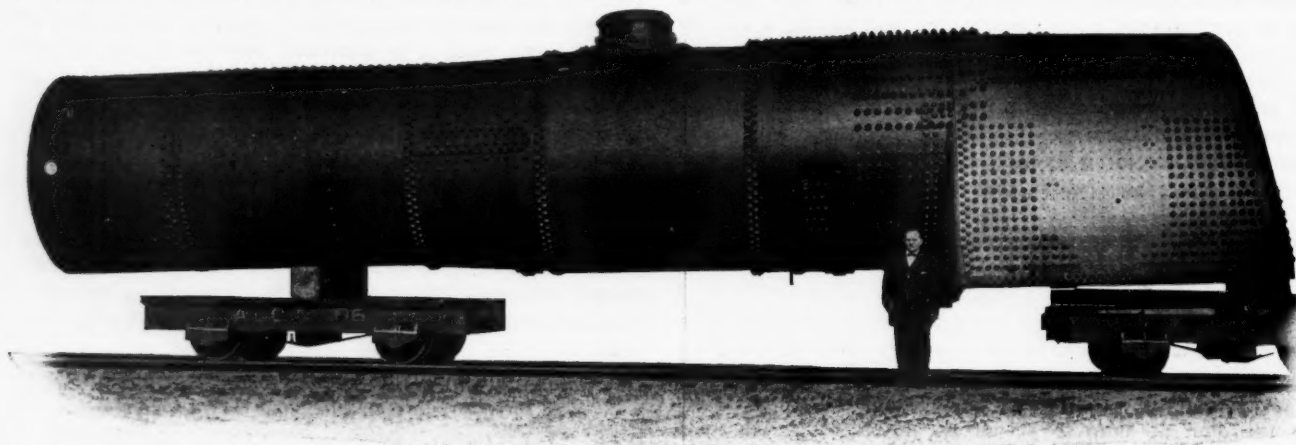
Mallet Articulated Compound Locomotive for the Delaware & Hudson.

Hitherto the freight traffic on this division has been handled by consolidation locomotives, known on the road as Class E-5, having a theoretical maximum tractive power of 49,690 pounds, a total weight of 252,000 pounds and a weight on driving wheels of 223,000 pounds. A single Class E-5 engine can very satisfactorily handle a 2,600-ton train from Ararat to Oneonta, but it requires the assistance of two locomotives of the same class, as pushers, to haul this load up the 19-mile grade to Ararat, at which point the pushers cut loose. With this power a speed of about 10 miles per hour can be maintained on the six-mile ruling grade from Carbondale to Forest City and a speed of 15 miles per hour over the remaining 14 miles of the ascent.

With a view to reducing the operating expenses of the division and facilitating the movement of trains, the officials

and power, constructed by these builders. The wheel arrangement is of the 0-8-8-0 type, and the design is based on the articulated locomotives built for the Erie Railroad in 1907, with 35,000 pounds increase in weight and 10 per cent. more power, thus giving a good margin of power to meet the varying conditions of service on the line of the Delaware & Hudson.

The general appearance of the locomotive is shown in the illustrations. In working order it has a total weight of 445,000 lbs., all of which is carried on the driving wheels. The high-pressure cylinders are 26 in. in diameter by 28 in. stroke, and the low-pressure cylinders are 41 in. in diameter with the same stroke. With the boiler pressure of 220 lbs. and driving wheels 51 in. in diameter, the theoretical maximum tractive power, working compound, calculated by the American



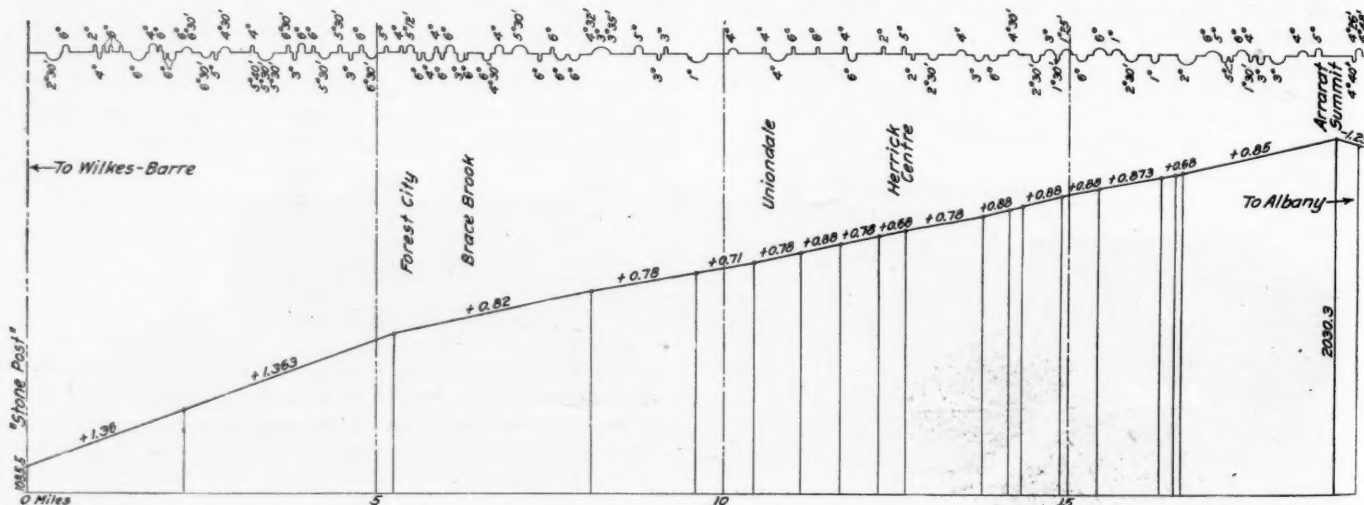
Boiler for Delaware & Hudson Mallet Articulated Compound Locomotive.

of the Delaware & Hudson Company decided to investigate the efficiency of the Mallet type locomotive for this service. The aim was to secure a pusher engine of this type of sufficient power to move the maximum train load up the hill with two engines instead of three.

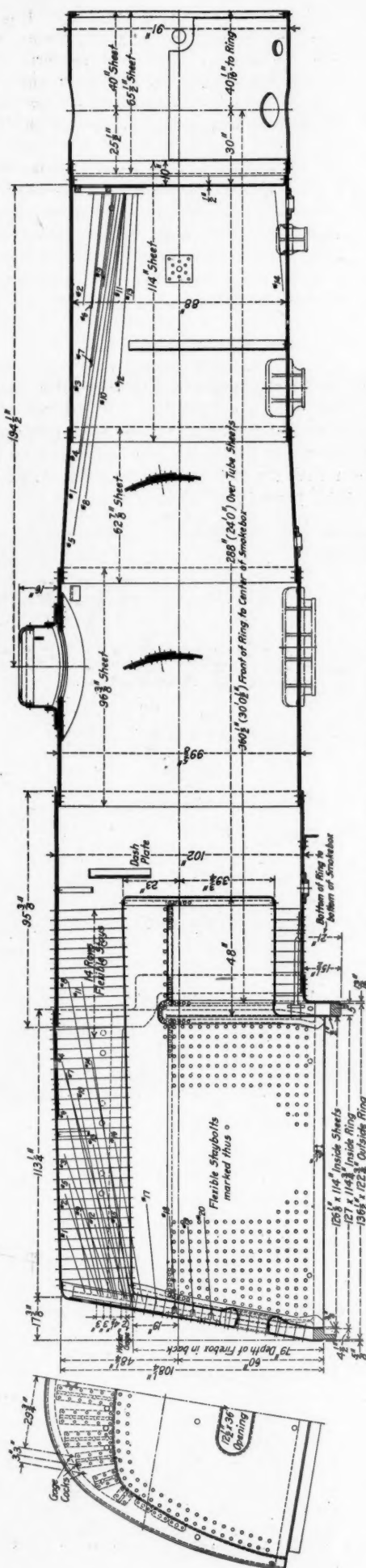
In the fall of last year one of the heavy Mallet engines built by the American Locomotive Company for the Erie Railroad was borrowed and put into pusher service on the 19-mile Ararat grade. A number of test runs were made, which proved that a single Erie Mallet engine easily did the work of two of the Class E-5 consolidation locomotives. Following these tests six Mallet engines were ordered from the American Locomotive Company and put into service. These engines are of a straight forward design, embodying but slight modifications from the designs of previous locomotives of this type, of lesser weight

Locomotive Company's formula, is 105,000 lbs. As this formula, which is applicable only to articulated locomotives built by the American Locomotive Company, is based on the results obtained from a large number of indicator cards, taken under various service conditions, it is found that the tractive power thus calculated represents very accurately the actual power that the locomotive can develop at a piston speed of not over 250 ft. per minute. With the American Locomotive Company's system of compounding, the normal maximum tractive power working compound can be increased about 20 per cent. by changing the engine into simple. The maximum tractive power of these engines working simple is thus 126,000 lbs.

With the same average weight per driving axle and a rigid wheel base 2 ft. 3 in. shorter, these articulated locomotives, under normal working conditions, have over twice the power



Profile of That Part of the Delaware & Hudson Over Which the Mallet Compound Locomotives Operate.



Boiler of the Mallet Articulated Compound Locomotive, Delaware & Hudson.

of the Class E-5 consolidation locomotives, and in case of emergency can exert a tractive power more than two and one-half times as great as the latter. One of these engines as a pusher and a Class E-5 locomotive in the lead, will easily take a 2,600 ton train up the grade, where it previously took three Class E-5 locomotives. The six articulated locomotives in this order will, therefore, relieve 12 of the consolidations from this service without sacrificing any tonnage, and with a saving in operating expenses due to handling less units.

Apart from the increase in size and power, the principal changes in the design from that of the Erie engines, are a different arrangement of high-pressure steam pipes, and the location of the cab over the firebox. Owing to the large diameter of the boiler, it was thought desirable in this instance to locate the high pressure steam pipes underneath the running boards, as shown in the illustration of the side elevation. Steam is led from the throttle through a dry pipe to the smokebox, where it is divided in a tee-head and passes into two branch pipes, one in either side of the smokebox, in the same manner as in a single expansion engine. From these branch pipes, to which they are connected through elbows with ball joints, two wrought iron steam pipes extend back underneath the running board, one on either side of the boiler, to the high pressure cylinders. An elbow covers the steam passage in the cylinders, to which the steam pipe is joined by means of a specially designed connection having a ball joint at either end and fitted with a slip joint. This construction permits of the expansion and contraction of the steam pipe, due to variations in temperature, and also facilitates removing and putting it up when repairs are necessary.

Although the ostensible reason for this location of the steam pipes was to clear away an obstruction on the side of the boiler, that might, otherwise, block the view ahead of the engineman, it really makes but little difference. The firebox is so wide and so nearly fills the whole space between the walls of the cab that the front window is very small and is set so high that, when the man is in his seat, the opening ahead is above his line of vision; hence he would, in any event, be unable to see his rails, and he must lean out of the window in order to do so. Whether the signals would be difficult to catch through this small opening is doubtful, but it is quite certain that the driver will put his main dependence upon the side windows for the view ahead.

The design of the cylinders follows the company's usual practice. The low-pressure cylinders are the largest ever applied by these builders, being 41 in. in diameter by 28-in. stroke. Steam is distributed to the high-pressure cylinders by 14-in. piston valves having inside admission and ample port area to meet the requirements. The low-pressure cylinders are equipped with Mellin double ported balanced slide valves, which have been used so successfully on the articulated locomotives. Special provision has been made for strengthening the valve yoke. This is stayed by two longitudinal bolts which pass through cored passages in the valve. The bolts, which are 1 in. in diameter, are fitted with 1-in. wrought iron pipe thimbles, which act as spacers. By-pass valves of the standard pattern are provided for the low-pressure cylinders. These are located in chambers in the side of the cylinder castings and automatically establish communication between the two ends of the cylinder when the throttle is closed.

The valve gear, which is, of course, of the Walschaert type, is reversed by the same hydro-pneumatic reversing gear that was used on the Erie engines. A slight modification from the arrangement employed on previous engines of the articulated type has been made. This modification consists, first, in connecting the piston rod of the reversing engine to a downward extension of the arm on the main reverse shaft, instead of to the main reverse lever itself. Also, the handle of the main reverse lever which ordinarily projects above the deck of the cab is in this instance cut off, thus providing more

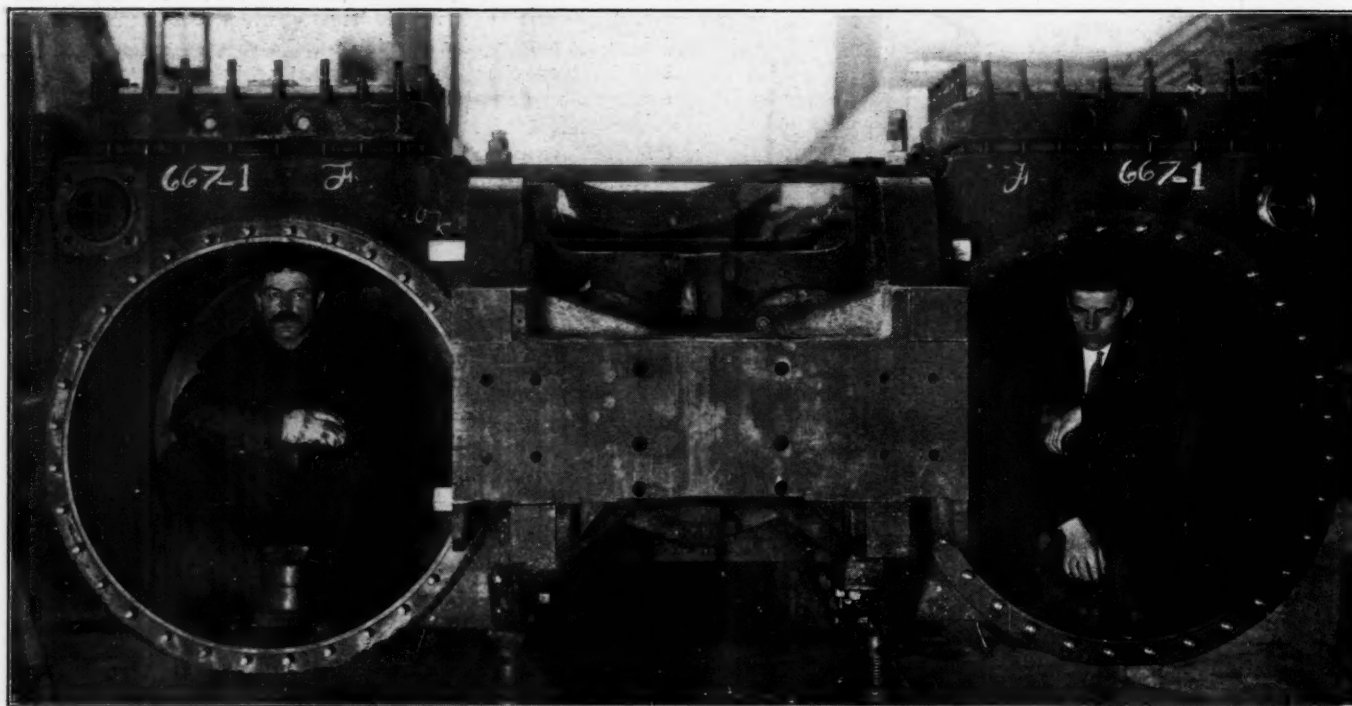
room in the cab. A separate handle for the main reverse lever is provided, which can be easily applied in case it is necessary to operate the lever by hand in case of an accident to the power gear.

The frames throughout are of Vanadium cast steel of large section and were made by the Union Steel Casting Co., of Pittsburgh. The frames of the rear engines have a single front rail cast integral with the main frame, while those of the front system are provided with double front rails, the lower one of which is in one casting with the main frame. Both sets of frames are $5\frac{1}{2}$ in. in width throughout, except that portion of the lower front rails of the front frame which is underneath the cylinders. This portion is reduced to $3\frac{1}{4}$ in. in width, and is reinforced by an auxiliary rail 4 in. wide, bolted to the inside of the lower rail and extending the full length of the cylinders. Over the pedestals, the upper rails of the main frames are $6\frac{1}{2}$ in. deep, while between pedestals the depth of section is 5 in., except at those points where the equalizing beam fulcrum castings are introduced, where it is increased. The bottom rails of the frames are in the main $4\frac{1}{4}$ in. deep, except above the pedestal caps, where the depth of section is increased to $5\frac{1}{4}$ in.

A single articulated connection is used between the front

The location and arrangement of the cross braces are shown in the illustrations.

Two features which have proved very successful in the articulated locomotives built for the Erie Railroad have been incorporated in this design. These are the floating balance device and the side spring buffers at the frame union. The floating balance device which is located between the second and third pair of drivers of the front system immediately back of the boiler bearing, which carries the spring centering device, consists of a pair of spring supported columns. These have ball and socket connection at their upper ends with the saddle casting of the boiler bearing to a similar connection at their lower ends with two castings hinged at one end to the bottom of the cast steel cross tie between the lower rails of the frames. The outer ends of these hinged castings rest in "U" bolts and are supported by coil springs seated on the cross tie. These columns serve to support the portion of the weight which would otherwise come on the main boiler bearing thus relieving that bearing of excessive pressure. In this instance, the total initial compression of the springs is about 30,000 lbs. This detail was illustrated in connection with the Erie locomotive in the *Railroad Gazette*, October 4, 1907, page 388. With this arrangement that part



Low Pressure Cylinders for Mallet Compound Locomotive.

and rear systems. This is formed by a cast steel radius arm rigidly bolted to a cast steel pocket casting securely bolted to the bottom rails of the rear frames, which also extends back underneath the high pressure cylinder saddle, to which it is bolted. The coupling is made by means of a vertical pin 6 in. in diameter, inserted from the top. This gives a very strong and substantial connection between the two engines, and at the same time the use of the single articulated connection permits of the vertical movement of the two frames relative to each other, without any binding in the joint.

An exceptionally strong and substantial system of frame bracing is employed. In the front and back systems there are in all 16 cross braces between the frames, taking into consideration the high and low-pressure cylinder castings. All the cross ties are of cast steel and of such a construction as to provide the maximum of strength with the minimum weight. With but one or two exceptions, the several cross-ties extend down to the bottom rails of the frames and are secured to the frames by both horizontal and vertical bolts.

of the weight of the boiler that is carried by the front system is divided up between three point supports, namely, the self-adjusting sliding balance valve, located between the third and fourth pair of driving wheels, the spring supported columns and the pair of adjustable hinged bolts which connect the frames of the two systems. The surface of the boiler bearing is located between the second and third pair of driving wheels which are normally not in contact, so that this bearing does not support any weight except under unusual conditions. With this construction the columns are free to sway in any direction, while they support a load equal to the total compression of the four springs. In this case, the total initial compression of the springs is about 30,000 lbs., which amount is taken off the main boiler bearing.

Besides relieving the main boiler bearing of the load which they support, the floating columns throw a certain load on the equalizing bolts in the rear of the frames; since the three supporting points constitute a system of support similar to the balanced beam, with the main boiler bearing as the

fulcrum, the loads carried in the supporting columns and the equalizing bolt as the weights applied at either end. Consequently, if the system is in equilibrium, for any load supported by the floating columns, the equalizing beam must receive a load having the same proportion to the other as the respective distances of the floating columns and the equalizing bolts from the main boiler bearing have to each other.

As the sum of the loads supported at each of the three points is equal to that part of the weight of the boiler that is carried on the front system, the total amount of the load removed from the main boiler bearing, by the introduction of the floating balance device, is equal to the sum of the load supported by the columns themselves and that thrown on the equalizing bolts. In this engine, the floating columns are 52 in. from the main boiler bearing, and the equalizing bolts are 65½ in., so that with 30,000 lbs. supported by the columns, about 54,000 lbs. is removed from the main boiler bearing. In passing through curves, the horizontal component of the force exerted by the springs is expected to counteract the increasing resistance of the centering spring, and thus maintain a practically uniform side resistance on curves of different radii. In engines of the articulated type of ordinary weight,

thereby increasing the flange friction of the front driving wheels. The action of the spring buffer is to counteract this side push of the load head, and thus reduce the resistance. In cases where the wheel base is comparatively long, as in the present instance, and the engine is engaged in pushing service, these buffers have been found to be very effective. Apart from its enormous size, the boiler is of special interest because of the careful attention with which every detail of the design is worked out to provide the greatest efficiency. The boiler is of the radial stayed type with conical connection sheet. At the first course the barrel measures 90 in. in diameter outside, while the outside diameter of the largest course is 102 in. The barrel is fitted with 446 tubes 2¼ in. in diameter and 24 ft. long. The arrangement of the tubes is clearly shown in the illustrations of the boiler cross-section. A liberal width of bridges between the tubes is provided, 3⅛ in. between centers.

A 4-ft. combination chamber is radially stayed to the shell of the boiler. Ample space is allowed between the combustion chamber and the shell of the boiler on all sides to insure good circulation of the water. The width of the water space is not less than 8½ in. and increases to 11¼ in. at the bottom.

Over the crown of the combustion chamber and down to



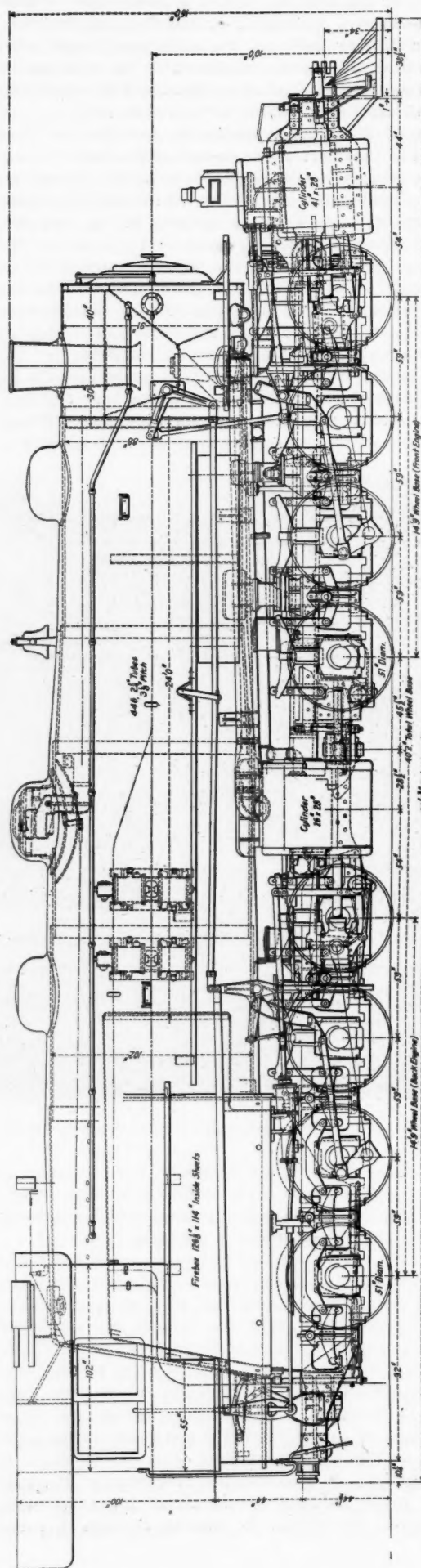
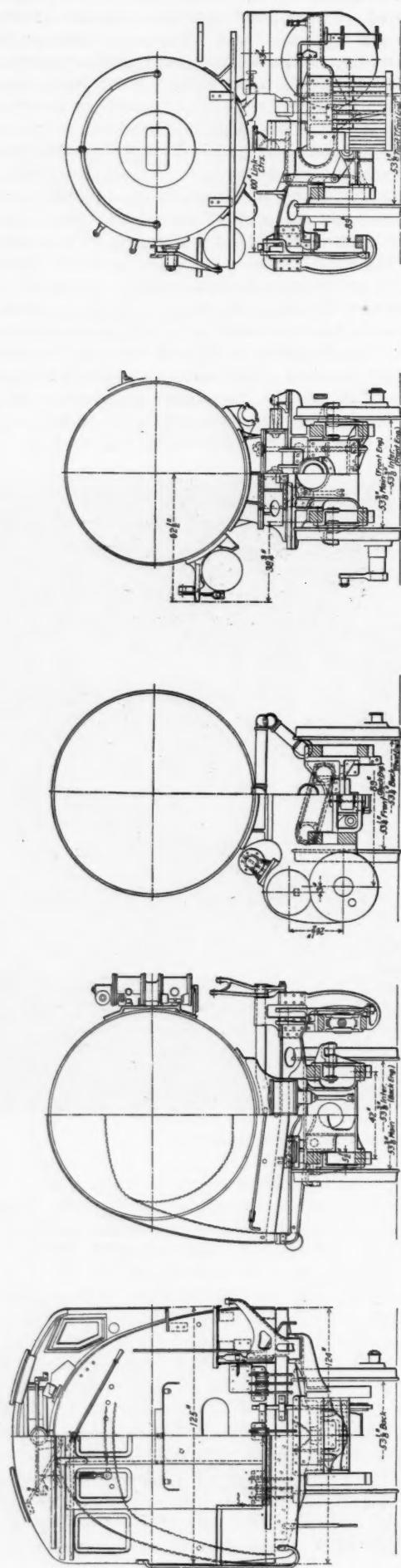
Vanadium Cast Steel Frames for Delaware & Hudson Mallet Locomotive.

the floating balance device is not necessary, but in designs of such enormous weight as the engines here illustrated, where the bearing pressure on the boiler support would otherwise be excessive, its distinct advantage is apparent.

The side spring buffers are located in the pocket casting of the articulated connection, one on either side, and as far apart as possible. They are so designed that, when the engine is on a tangent, the buffers just touch the bumper castings bolted to the cast steel crosstie at the ends of the rear frames. Thus, when the engine enters a curve one or the other of the buffer springs is compressed. When the engine is curving, these buffers serve to direct the pushing force through the center of the wheel base of the front engine instead of through the flange of the outside forward driving wheel as it would be were it not applied. In pushing, the resistance of the head load tends to swing the front system about the center of its wheel base when the engine is passing through a curve,

the second row of staybolts above the center line of the boiler flexible staybolts are used. All the plates of the boiler shell, are, of course, very thick, the heaviest plate being 1⅞ in. thick, and the lightest 1 in. The firebox is 114 in. wide and 126⅛ in. long, and provides a grate area of 100 sq. ft.

The detail to first attract attention in this boiler, aside from its great size, is the length of the tubes. This dimension has been gradually increased from the 14 ft. and 16 ft. standards of a few years ago, until a length of 20 ft. has been successfully used. But 24 ft. is very unusual and there is no record in this office of the previous use of such length. Whether a tube of 24 ft. in length would be workable and economical under ordinary conditions is difficult to say. It is well known, of course, that the temperature of the escaping gases is such that the last few feet of these excessively long tubes do not seem to possess any very great amount of steam producing capacity.



Elevations and Sections; Delaware & Hudson Mallet Articulated Compound Locomotive.

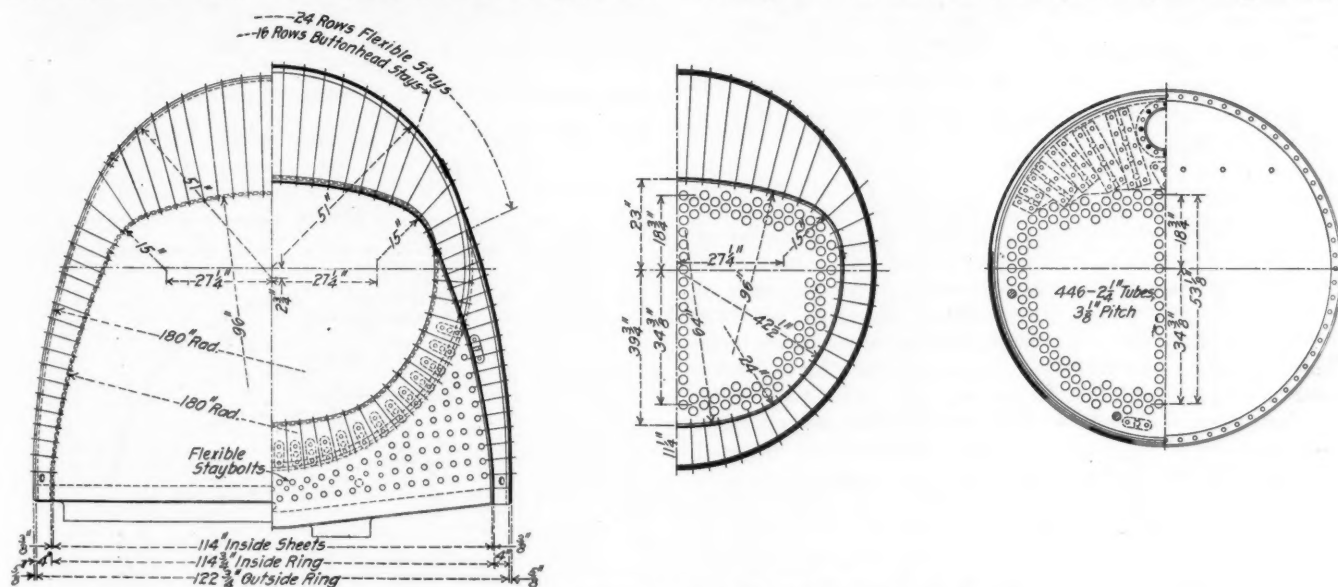
In order to meet these objections and utilize the long tubes to the utmost, an innovation has been introduced into the boiler in the form of a $\frac{1}{2}$ -in. plate set 5 ft. 6 in. back of the front tubesheet. This plate forms an intermediate tubesheet and is drilled to receive and support the tubes. With this support any excessive vibration of the tubes is prevented, and as far as any mechanical conditions are concerned they have the same support as tubes of 18 ft. 6 in. in length, which, for a diameter of $2\frac{1}{4}$ in. will cause no trouble.

To this mechanical advantage must be added another in the domain of evaporative efficiency. The boiler is divided by this plate into two parts, and it is into the short forward portion that the feed water is delivered from the injector. Hence all of the water in the after part must reach it by flowing over the top of the plate as over a weir. So, although the water in each portion is subjected to full boiler pressure and the surfaces are in contact with the saturated steam, it is very evident that the temperatures of the water in the two will not be the same and that that in the forward section will be the cooler of the two. The result will be that the difference in the temperatures of the water and the gases, at the front of the tube, will be greater than could possibly be the case without the plate, and there should be an appreciable

frame special care was taken to provide a strong and rigid construction. The longitudinal sills are constructed of 15-in. steel channels weighing 33 lbs. to the foot; and top and bottom cover plates are used. Both the front and rear bumpers are of cast steel. The tender trucks are of the four-wheel arch-bar type, the design following the Delaware & Hudson Company's standard practice; and have a carrying capacity of 100,000 lbs. each.

SERVICE TESTS.

Immediately upon the delivery of the first of these locomotives an inquiry was set on foot in order to ascertain as to how nearly they came to meeting the requirements, and the result of this preliminary work is that they have been found capable of performing the work demanded. In the preliminary test the Mallets were pitted against two of the E-5 consolidation locomotives that were formerly put at the rear of the train. These engines had cylinders 23 in. in diameter, with a stroke of 30 in. The driving wheels were 50 in. in diameter and carried 222,000 lbs., the total weight of the engine being 250,000 lbs. The total heating surface was 3,716 sq. ft. and the rated tractive effort is 49,690 lbs. The method of observation was to put a man on the train who noted the floating car that was sometimes pulled by the engine ahead



Cross-Sections of Boiler, Mallet Articulated Locomotive.

increase in the evaporative efficiency of this last 5 ft. of tube. As to just what this may be, only service can show.

In this connection there are a number of details that should be observed. The circulation in this front portion should be watched and determinations made as to whether or not the water from the injector settles to the bottom as it is supposed to do in an ordinary boiler, or whether there is a general diffusion and uniform distribution of the heat, and also as to just how much the temperature of the gases is reduced below that of the ordinary boiler having tubes of from 19 to 20 ft. in length; a reduction that would be a measure of the efficiency of this last five ft. in this arrangement of boiler.

Two Chicago sight feed flange oilers are provided for oiling the flanges of the front and back wheels of each system when the engine is passing through a curve. These are located on the back head of the boiler and oil is fed from them by steam pressure through a pipe line, from which there are leads to the above-mentioned wheels. A single firedoor is provided in the firebox, equipped with a Franklin automatic opener. Iron sliding doors are provided at the back of the cab, which may be closed when the engine is backing.

The tender is fitted with a water bottom tank of large capacity. The tank carries 9,000 gallons of water and the coal space holds 14 tons of coal. In the design of the tender

and again pushed by the one at the rear. The results of this are given in the following table, which shows the work done by the pusher locomotive, regardless of the total weight of the train, or that hauled by the leading engine.

Preliminary Test Summary—Pushing Engines.
Class-H Engines 1600 and 1601 against Class E-5 Engines 1035 and 1039.

Pusher engines.	Run No.	Average tonnage pushed.	Average lbs. coal burned.	Average ton-miles per 1,000 tons coal burned.	Average ton-miles per 1,000 tons coal burned at average speed, 9.42 miles per hour.	Average actual speed.
1600	3.4	1,450	11,125	4,887,640	4,887,640	9.42
1601	8.9	1,412	12,375	4,278,800	4,150,690	8.63
E-5—1035 & 1039.	5, 6, 7	1,522	17,300	3,299,100	3,563,030	11.7

From this it appears that, although the speed was less, and the actual tonnage pushed was less with the Mallets than with the consolidations; the ton-miles hauled per 1,000 lbs. of coal burned was about 39 per cent. more. This work is shown in detail in the second table which covers the work of one week. Incidentally, this table also shows the comparative amounts of coal used and water evaporated with the two methods of pushing. On the day of the heaviest load 13,530 lbs. of coal were burned in the firebox of the Mallet in 2 hrs. and 36 min., and in that time the water evaporated was 11,589 gallons. Roughly speaking, this is at the rate of about 7.14 lbs. of water per lb. of coal, and this holds, with slight variations for the other runs. In the case of the consolidations, on

the date of their heaviest coal consumption, they burned 17,850 lbs. of coal and evaporated 11,860 gallons of water. This gives a rate of evaporation of a little less than 5.54 lbs. of water per lb. of coal.

There is no data at hand as to the condition of these engines,

Weight of engine and tender in working order. 611,800 lbs.
Wheel base, driving, rigid. 14 ft. 9 in.
" " total. 40 ft. 2 in.
" " of engine and tender. 75 ft. 7 1/4 in.
Cylinders.
Type. Compound
Diameter. 26 and 41 in.
Stroke. 28 in.

THE DELAWARE & HUDSON MOTIVE POWER DEPARTMENT TEST. Pushing Engines, W. C. Tower, Carbondale, to Ararat Summit.							
Run	No. 3.	No. 4.	No. 8.	No. 9.	No. 5.	No. 6.	No. 7.
Date	Apr. 23, a.m.	Apr. 23, p.m.	Apr. 30, p.m.	May 1, a.m.	Apr. 28, p.m.	Apr. 29, a.m.	Apr. 29, p.m.
Head engine	1044	1034	1018 & 1008	1033	1016	1048	1020
Number of cars moved:							
Pusher engines	27	26	28	27	34	28	29
Head engine	16	15	31	16	13	14	14
Tonnage:							
Actual, in train	2,304	2,432	3,105	2,225	2,188	2,312	2,279
Light weight cars	765	739	1,065	750	768	767	762
Weight contents	1,539	1,693	2,040	1,475	1,420	1,545	1,517
Actual, pushed by pusher engines	1,400	1,503	1,406	1,418	1,497	1,546	1,532
P. et. train pushed by pusher engines	60.76	61.8	45.28	63.73	68.4	66.86	66.78
Actual running time between:							
W. C. tower to Forest City	49 min.	45 min.	70 min.	46 min.	31 min.	38 min.	45 min.
Forest City to Ararat Summit	71 min.	74 min.	86 min.	66 min.	57 min.	56 min.	64 min.
Miles per hour:							
W. C. tower to Forest City	6.12	6.66	4.27	6.49	9.81	7.94	6.66
Forest City to Ararat Summit	11.65	11.18	9.62	12.5	14.47	14.78	12.85
Data from W.C. tower to Ararat Summit:							
Average pressure: Head pusher					178	198	210
Rear pusher	206	198	190	208	193	205	199
Pounds coal burned: Head pusher					8,850	8,860	8,800
Rear pusher	12,000	10,250	13,530	11,220	9,000	8,840	7,550
Gallons water used: Head pusher					5,948	6,351	7,249
Rear pusher	9,736	8,748	11,589	8,717	5,912	5,129	7,707
Actual running time	2 hr. 0 min.	1 hr. 59 min.	2 hr. 36 min.	1 hr. 52 min.	1 hr. 28 min.	1 hr. 34 min.	1 hr. 49 min.
Average miles per hour	9.38	9.45	7.21	10.05	12.79	11.98	10.33
Kind of coal: Soft	50 per cent.	50 per cent.	50 per cent.	50 per cent.	See Note.	See Note.	See Note.
Pea	50 per cent.	50 per cent.	50 per cent.	50 per cent.	See Note.	See Note.	See Note.
Engine numbers, pusher engines:							
Head pusher engine	No. 1600.	No. 1600.	No. 1601.	No. 1601.	No. 1035.	No. 1039.	No. 1035.
Rear pusher engine	No. 1600.	No. 1600.	No. 1601.	No. 1601.	No. 1039.	No. 1035.*	No. 1039.*

NOTE.—Different grades and the per cent. are: Pea, 47.4; Buckwheat, 33.5; Grate, 2.3; Stove, 0.7; Bird, 1.3; Ches. 2.4; Screen, 1.7, and Soft, 10.7.

*Bad rail—snow and rain.

but, as the test was made for the private information of the railway officials, and not for publication or the exploitation of the Mallet locomotive, it is fair to presume that engines in good condition were selected for the work. The difference in the evaporative efficiency of the boiler is, therefore, very significant, and shows how very much more economical the large unit is than the small one, and why, though pushing a smaller tonnage, the work of the Mallet was the more economical when put upon the basis of coal consumption per ton-mile. It must be borne in mind, too, that probably the internal resistances of the Mallet were more than those of both of the consolidations combined, and finally that there was a handicap in the fact that, on one engine one man was required to handle from 5 to 7 tons of coal, whereas 4 1/2 tons was the maximum for one man on the consolidations. Further tests, and tests of greater refinement are to be made with these engines, which, when completed will be made public. Meanwhile what has already been done serves to demonstrate that the adoption of Mallets on this pusher grade has been a movement in the direction of economy of operation, and if the design can be so improved that the internal resistances will be less, the value of the type will be proportionately increased.

The principal dimensions and ratios of the design are given in the following table:

Ratios.	
Weight on drivers	= 4.24
Tractive effort	
Tractive effort x diameter drivers	= 807.81
Heating surface	
Total heating surface	= 66.29
Grate area	
Firebox heating surface	= 5.32*
Total heating surface	
Total weight	= 67.13
Total heating surface	
Displacement of 2 h.p. cylinders, 17.2 cu.ft.	
Total heating surface	= 385.41
Displacement of 2 h.p. cylinders	
Grate area	= 5.81
Displacement of 2 h.p. cylinders	

*Per cent.

General data.	
Service	Pusher
Fuel	Mixture bituminous and anthracite coal
Weight, total in working order	445,000 lbs.

Valves.	
Type, high pressure	Piston
Type, low pressure	Double ported slide
Steam lap, high pressure	1 1/8 in.
Steam lap, low pressure	1 in.
Exhaust lap, high pressure	1/8 in.
Exhaust lap, low pressure	1/8 in.
Lead	1/8 in.

Wheels.	
Driving, diameter	51 in.
Driving axles—size of journals	10 x 12 in.

Boiler.	
Working pressure	220 lbs.
Firebox, length and width	126 1/2 in. x 114 in.
Firebox, water spaces	F, 5 in.; S, 4 in.; B, 4 1/2 in.
Firebox sheets, thickness	Crown, slides and back 3/8 in. tube sheet 1/2 in.
Tubes, number	446
Tubes, material	Spellerized steel
Tubes, diameter and length	2 1/4 in. x 24 ft.
Heating surface, tubes	6,276 sq. ft.
Heating surface, firebox	353
Heating surface, total	6,629
Grate area	100
Exhaust pipe	Single
Exhaust nozzle, diameters	6 1/2 in., 6 3/4 in., 7 in.
Smokestack, diameter	18 in.
Smokestack, top above rail	16 ft.

Tender.	
Tank, capacity, water	9,000 gals.
Tank, capacity, coal	14 tons
Wheels, diameter	33 in.
Axles, size of journals	5 1/2 x 10 in.

TELEPHONES FOR EMERGENCIES ON TRAINS.

Since the establishment of telephone lines by railways the carrying of telephones on passenger trains and wrecking trains has been noticed frequently in these pages; but it has remained for the Erie Railroad to publish examples of actual use of the portable telephones where passenger trains have been delayed between stations. In the *Erie Railroad Employees' Magazine* for April mention is made of two occasions calling the telephone apparatus into use. On January 13 Engine 2551 on Train 3 broke a side rod about one-half mile east of Cocheton station, and inside of four minutes after the break the conductor was in communication with the train despatcher.

On January 22 Engine 2563 on Train 5 knocked out a cylinder head one mile east of PS Tower at 12:48 a. m., and at 12:52 a. m. the despatcher was fully advised of the occurrence. A relief engine was sent from Callicoon, which started Train 5 on its way at 1:30 a. m., with a total delay of 42 minutes. It

is estimated that the delay without the telephone would have been much longer. Both these occurrences were after dark, the second being about midnight. Probably with daylight to



An Erie Conductor Telephoning to the Train Dispatcher.

aid in locating the proper wires on the telegraph poles, communication could have been established in less time.

It is not alone in rushing information to headquarters concerning such accidents and getting help quickly that the portable sets show their value, but also in saving wear and tear

EXPANSION OF LOCOMOTIVE BOILER SHEETS.

Important facts concerning the inequality of expansion in locomotive boilers, based upon thoroughly practical tests and observations of boilers in operation extending over a long period, were brought out by D. R. MacBain, superintendent of motive power of the Lake Shore & Michigan Southern, in an illustrated address at the May meeting of the New York Railroad Club. The most important fact was that with the fire at a high temperature and good circulation in the boiler the outer firebox sheets expand more than the inner ones. The tests which showed this can best be described in Mr. MacBain's own words.

"Fig. 1 shows some tramming done to determine if, under certain conditions, there is a difference between the amount of expansion that takes place in the inner and outer sheets of a firebox. This work was carried out most carefully and under conditions which we believe were such as to give a very fair idea of what takes place in a locomotive firebox when the temperature of the fire is high and circulation of water is good. The process of making these determinations was as follows:

"A wide firebox boiler was selected; trams of solid steel were prepared, and a set of marks were made on the inner and outer sheets from these trams. The boiler was then fired up and, when the pressure reached 200 lbs. and the pops had been open for a few minutes, the fire was drawn hastily, during which process the trams were tried to their respective marks on the outside sheets; immediately afterward (within a few minutes) the trams, in the proper order, were tried to the marks on the inner sheets, and the data shown below is the result, indicating that the expansion of the outer sheets of the

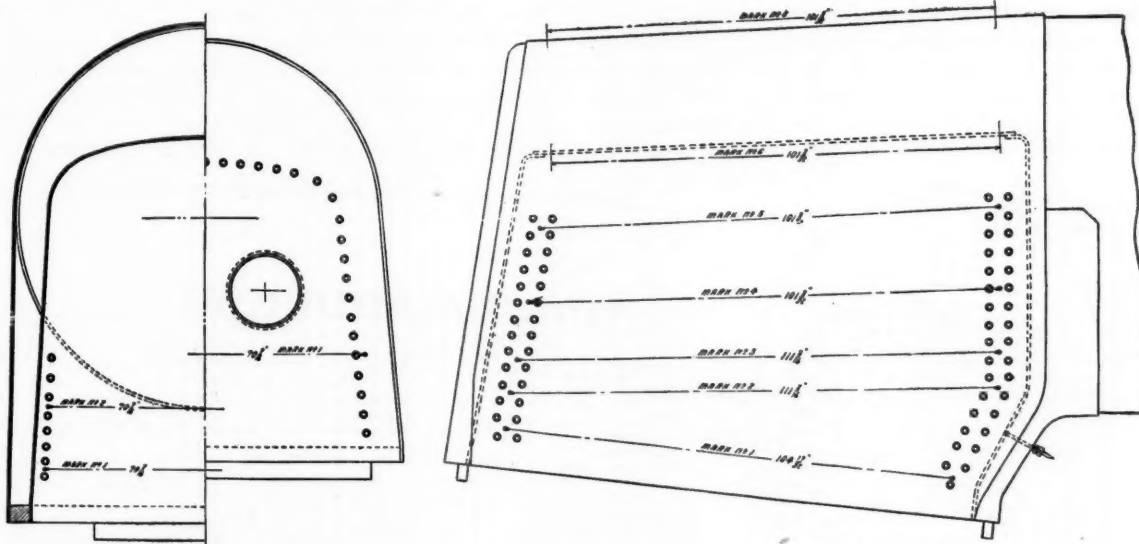


Fig. 1—Location of Tram Marks to Determine Difference in Expansion between Inner and Outer Firebox Sheets.

on the dispatcher's nerves. In the case of Train 5 above stated, the train left NO Tower about 12:43 a. m. and was expected at PS about the time of the accident. It would have taken from 10 to 15 minutes to get a man a mile west through the snow to the tower, and in the meantime the train dispatcher would have been giving his imagination full sway in order to account for the non-appearance of the train at PS.

The picture shows Conductor J. H. Fisher, of Train No. 1, on the Delaware division. The engineman and fireman are supposed to be engaged in taking down a broken side rod. Conductor Fisher is not a man with white hair and moustache. The appearance of these features in the photograph is due to reflection of light from the bright surfaces of the telephone apparatus.

firebox was greater, in every case, than that of the inner sheets.

Mark No.	Outside wrapper sheet		Inside of firebox		Difference in expansion
	Location.	Expansion.	Location.	Expansion.	
1.	Side sheet.	$\frac{1}{8}$ -in.	Side sheet.	$\frac{1}{8}$ -in.	$\frac{1}{8}$ -in.
2.	"	$\frac{1}{8}$ -in.	"	$\frac{1}{8}$ -in.	$\frac{1}{8}$ -in.
3.	"	$\frac{1}{4}$ -in.	"	$\frac{1}{8}$ -in.	$\frac{1}{8}$ -in.
4.	"	$\frac{1}{8}$ -in.	"	$\frac{1}{8}$ -in.	$\frac{1}{8}$ -in.
5.	"	$\frac{1}{8}$ -in.	"	$\frac{1}{8}$ -in.	$\frac{1}{8}$ -in.
6.	Wagon top.	$\frac{1}{8}$ -in.	Crown "	$\frac{1}{8}$ -in.	$\frac{1}{8}$ -in.
1.	Throat sheet.	$\frac{1}{8}$ -in.	Tube sheet.	$\frac{1}{8}$ -in.	$\frac{1}{8}$ -in.
2.	"	$\frac{1}{8}$ -in.	"	$\frac{1}{8}$ -in.	$\frac{1}{8}$ -in.
1.	Black head.	$\frac{1}{8}$ -in.	(No record on door sheet.)		

This apparently accounts for the breakage of the back heads and throat sheets along the outer row of staybolts; also the vertical cracks in the side sheets, as well as cracks at the water bar holes. When the fire was first started,

and before circulation was fully established, the needle extending through the throat sheet moved out $\frac{3}{8}$ inch, and later, when circulation was established and the steam pressure began to raise, the needle moved backward about $\frac{1}{8}$ inch. The first movement of the needle throws some light on the cause of side sheets puffing along the fire line, as they sometimes do.

The diagram in Fig. 2 shows the result of a recent investi-

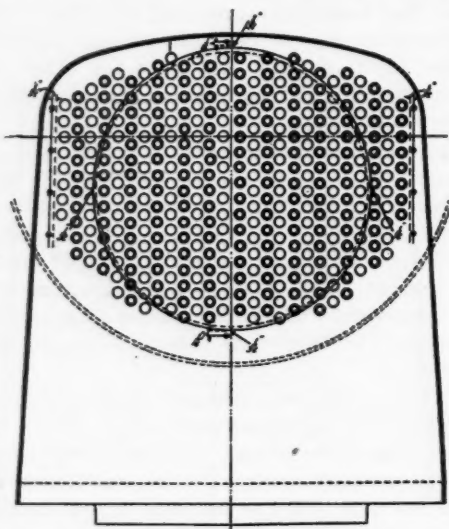


Fig. 2—Expansion of Tube Sheet Due to Prossering.

gation made by F. A. Linderman, supervisor of boilers of the New York Central & Hudson River, to determine the direction and extent of expansion in a flue sheet resulting from prossering in a set of new flues. The inner or dotted circle was scribed before the flues were put in and the outer one after they were prossered. The expansion of the sheet is very noticeable, especially at the top. This distortion is serious, especially when the process of prossering is employed

each end, and had their bearings on the wagon top, extending between points A and B, the zone covered by the three rows of bolts that caused trouble through excessive breakage. Another set of templates were fitted to a boiler of similar design, into which a special installation of flexible staybolts had been made, and, under hydrostatic test, up to 25 per cent.

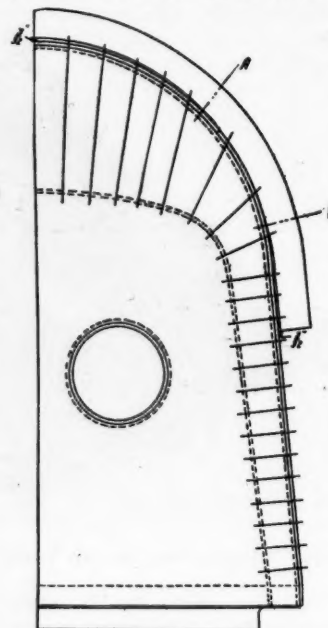


Fig. 3—Location of Template on Wagon Top.

above the rated steam pressure, the templates retained their fit on the wagon top, apparently indicating that the distortion noted above was due to expansion and not to pressure or to the use of the flexible staybolts.

To relieve the cracking of side and back sheets and back flue sheets in wide fireboxes, flexible staybolts were applied as shown in Fig. 4. Satisfactory results have been obtained with this arrangement on both the New York Central and Michigan

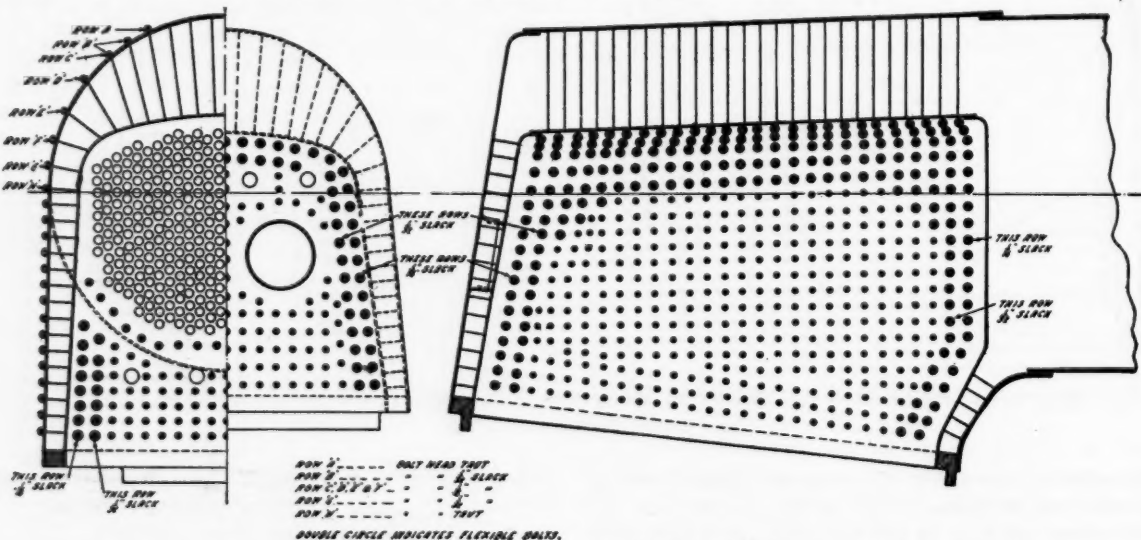


Fig. 4—Arrangement of Flexible Staybolts Which Eliminated Firebox Failures.

at least once every 30 days during the time the engine remains out of the shop. "It has been our experience that the prosser expander is less injurious in this respect than the ordinary roller expander, but, nevertheless, the question 'What can be done to curtail the use of expanders of any kind in making running repairs?' seems to be in order."

Fig. 3 shows the firebox of a large Pacific type locomotive, to which templates were fitted while the boiler was cold, and the effect in movement of the templates when steam was raised to 200 lbs. pressure. The templates lifted $\frac{3}{8}$ in. at

Central. A full installation in the throat sheet, set loose as follows, is also advisable:

First row above mud ring.....	Tight
Second row above mud ring.....	$\frac{1}{8}$ -in. loose.
All others	$\frac{1}{8}$ -in. loose.
And the back flue-sheet braces.....	$\frac{1}{8}$ -in. loose.

This will increase the life of a modern firebox from 50 per cent. to 75 per cent.; the loose installation of flexible staybolts in the throat sheet and slack braces to back flue sheet being considered necessary in order to avoid excessive staybolt and flue-sheet breakages, at the same time reducing the

strain on the arch-flue anchorages, the latter being quite a source of trouble when they begin to blow, especially at the front end.

In January, 1907, the firebox of an Atlantic type locomotive in heavy passenger service was given a complete equipment of flexible staybolts, including the radial stays. It was the intention to have made this firebox of one piece, but, owing to a defect in one of the side sheets, a half side sheet had to be applied; up to February 1 of this year, at which time the last examination was made, the engine had made 243,000 miles without one broken staybolt, without any vertical cracks in the side sheets, without any trace of a crack in the back head or throat sheet, and without any cracks, or any sign of a crack, leading away from the arch tube holes in the back flue sheet, nor has there ever been a tool on the side sheet seam. The engine has never been held one moment for boiler work, other than that of expanding the flues, since it went into service in February of 1907.

Inasmuch as it has continually carried a double brick arch—the old Coffin-McGeath brick arch installation—the record of this side-sheet seam is remarkable. It is believed that the results obtained are due to the loose installation of staybolts and radial stays referred to above.

To ascertain, if possible, why the back flue sheet, and the front one, too, for that matter, become deflected or distorted, the New York Central installed a set of flues in one of their large Pacific type locomotives about one year ago. The theory was that while the locomotive was working and the fire hot, with the circulation good, the expansion in the boiler proper

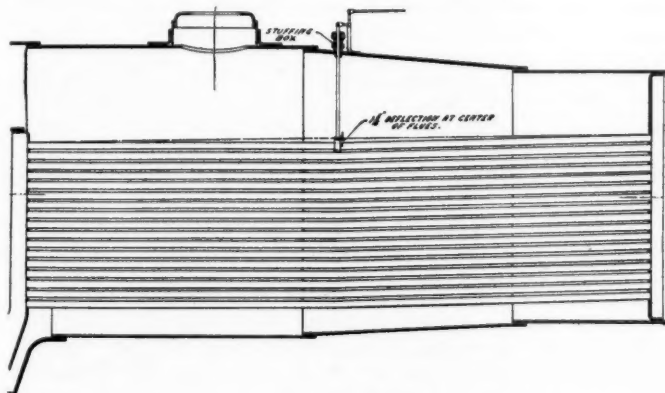


Fig. 5—Arrangement of Flues to Determine Difference in Expansion between Them and the Boiler Shell.

(between the flue sheets) was greater than that in the flues. The results of this test were rather remarkable. The standard gage flue on the New York Central is No. 11 B. W. G., and for this test No. 13 B. W. G. was used. One-half of the flues—those designated by the double ring in Fig. 2—were safe-ended with No. 11 B. W. G. and the other half were not safe-ended. The setting was according to standard practice, with the following exception: Mr. Linderman, supervisor of boilers, personally supervised the job, and each flue, before it was stuck at each end, was depressed at the center 1 5-16 in., Mr. Linderman personally doing the depressing and, at a signal from him, the man at each end stuck the flue in the sheet and expanded it. The whole set of flues (382) was applied in this way, and as a result they had a sag of about 1 in. more than normal when the job was completed.

A needle was attached to one of the top flues at the center and extended up through the shell, as shown in Fig. 5. It was attached to a recording device to show what, if any, movement took place under the various conditions of service from the time the fire was started in the box until the completion of a trip on the road. Fig. 6 shows the movement of the tube, to which the needle was attached, from the time the fire was started until 200 lbs. pressure was raised. Almost immediately after the fire was started the needle began to

pull downward, and continued in that direction fully $\frac{1}{8}$ in., and remained practically stationary for a few moments; then it began to rise and continued in that direction until about $\frac{1}{8}$ in. above the normal position, at which point the steam pressure began to raise, and the rise of the needle from that point up to 175 lbs. pressure was gradual; from 175 lbs. to 200 lbs. it was rapid, with the result that the total rise of the needle above the normal line was $\frac{1}{8}$ in. The rapid rise of the needle between the time the pressure increased from 175 lbs. to 200 lbs. cannot be accounted for, unless it did not work in the stuffing box quite as freely as it should; however, the packing in the stuffing box around the needle was very loose.

Arrangements were then made to make a road test, and the record is shown in Fig. 7. It will be noted that, immediately upon starting out, the needle began to pull downward, as shown by the solid lines; the dotted lines being the record

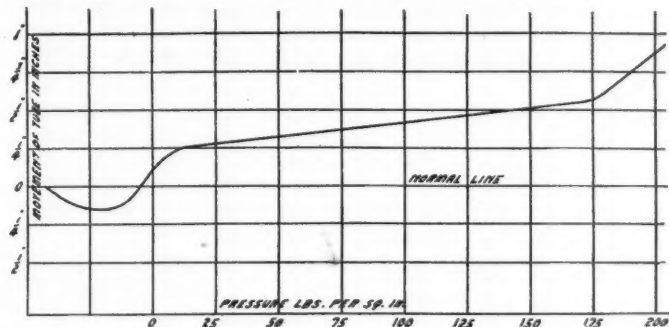


Fig. 6—Movement of Boiler Tubes in Getting Up Steam.

made after the throttle was closed and while drifting. The maximum downward pull on the needle was $\frac{1}{8}$ in., this point having been reached while the engine was being worked hard and running at good speed.

This engine was afterward put into regular service on heavy passenger trains, and at the same time another engine of exactly the same class, having a set of the standard No. 11 B. W. G. flues, set to correspond with standard practice, was put on in the same service; an accurate record of the cost of maintenance was kept of both. The engine with the special flues and special setting, in making 69,856 miles, never failed, while the engine with standard flues and standard setting, in making 71,774 miles, had a few detentions charged to it on

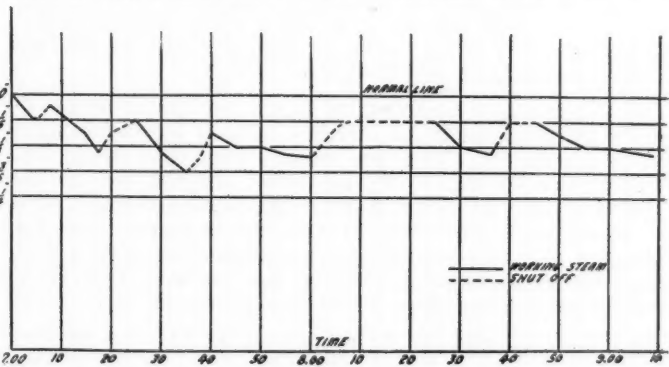


Fig. 7—Movement of Tube in Road Service. West Albany to Rotterdam City.

account of "flues leaking." The cost of maintenance of both engines is as follows:

Special flues and special settings: Cost per mile for flue work at engine houses	\$.0143
Standard flues and standard settings: Cost per mile for flue work at engine houses	.0195
Percentage in favor of special setting	26.7 per cent.

At the time these figures were made up there was no perceptible difference in the condition of the flues in the firebox of either engine, and the No. 13 beads seem to have stood the working as well as the No. 11 beads, which is believed to have been due to the fact that the No. 13 beads did not leak as often as did the No. 11 beads, and therefore did not require to be worked as much.

General News Section.

Vice-President Rea, of the Pennsylvania, is quoted as saying that the East river tunnel of that company, by which trains of the Long Island Railroad will enter Manhattan, New York City, will be in operation about August 15.

The Western Pacific has resumed the running of through freight trains between Salt Lake City and San Francisco after a suspension of about four weeks, made necessary by the serious damage to the company's track along the south shore of Great Salt Lake.

Henry S. Jacoby, professor of bridge engineering in Cornell University, has been granted a long leave of absence, and beginning July 1, will travel for seven months in the United States and Canada, visiting the bridge departments of railroads and cities.

On Friday last, the day of the funeral of King Edward of Great Britain, the trains of the Canadian Pacific, the Grand Trunk and the Canadian Northern were stopped at 1 o'clock in the afternoon, for a period of three minutes, out of respect to the memory of the late king. The same order was issued on the steamer lines controlled by the Grand Trunk.

The Chicago, Rock island & Pacific is making tests of washed gravel for ballast on its Iowa lines. A portion of the sand is being removed by screening the gravel as it is pumped out of the river. If the experiments which are now being made on a small scale show that the material gives good satisfaction in the track, its use may be continued.

According to an article in the *Telegraph & Telephone Age*, messages transmitted over ocean cables may now be received by sound. With apparatus devised by Dr. Isidor Kitsee, of Philadelphia, messages have been transmitted over a cable between New York and Canso, N. S., 800 miles, at a speed of 30 to 35 words a minute, and received, through the medium of two relays, on a sounder.

At Spencer, Mass., last week Thursday, May 19, the citizens of the town, acting with the Howe Memorial Association, dedicated a monument to Elias Howe, inventor of the sewing machine; William Howe, inventor of the Howe truss bridge, and Tyler Howe, inventor of the spring bed. William and Tyler Howe were brothers and Elias was their nephew. The three were born in Spencer in the same house, and the monument, which is a granite shaft 10 ft. high, bears on its face a bronze medallion portrait of each.

The Seaboard Air Line now has in use a telephone despatching circuit which is 272 miles long. It has 51 selector stations and 65 telephones. This line extends from Richmond, Va., southward to Raleigh, N. C., 156 miles, and the line on the Portsmouth division (116 miles long), which diverges from the Richmond-Raleigh line at Norlina, is looped into the main line. By this arrangement the despatcher at Richmond keeps track of the trains throughout the two lines—from Richmond to Raleigh and from Portsmouth to Norlina.

In connection with the dedication of the statue of Samuel Spencer at Atlanta last week, an officer of the Southern Railway said that the Terminal station, in front of which the statue stands, has increased the value of real estate in the vicinity of the station much more than the total cost of the station (which was \$2,000,000), and possibly many times this sum. The station, which was built by the Southern, the Central of Georgia and the Atlanta & West Point, was opened May 14, 1905. It was in an unpromising part of the city, and most of the buildings in the vicinity had become dilapidated, but now the ten business blocks adjacent to the station are among the best in the city.

Increases of Wages.

The Erie road, after protracted negotiations, has agreed with committees of its conductors and brakemen on an increase of wages. In general, the Baltimore & Ohio scale has

been adopted, and it is said that this means an increase on the Erie of about 10 per cent. The full increases, however, do not go into effect for more than a year, the company having presented strong arguments based on the insufficiency of the company's earnings to pay the higher rates. Freight conductors, for example, will receive \$3.50 per 100 miles on June 1 next, and the standard rate, \$3.63 per 100 miles, on July 1, 1911. The arrangement with freight brakemen is based on the same rule. Passenger conductors will receive \$2.50 per 100 miles June 1, 1910, and they will receive \$2.68 on September 1, 1911.

The settlement with the yardmen provides for dividing the yards into three groups, in the order of their importance, as was done on the New York Central, the pay in group No. 2 being one cent an hour less than in group No. 1, and the pay in group No. 3 being two cents an hour less than in group No. 1.

The conductors and trainmen on the Staten Island Rapid Transit Railroad, which is controlled by the Baltimore & Ohio, have had their pay increased in accordance with the Baltimore & Ohio settlement, but a later date is set for the full increases go into effect.

The Central of New Jersey has increased the pay of locomotive enginemen at rates varying from 7 to 12½ per cent.

The Delaware, Lackawanna & Western has increased the pay of firemen an average of 12 per cent. The leaders of the conductors' and brakemen's brotherhoods report that the agreement with the Lackawanna concerning increases of pay has not yet been signed, the road holding that certain exceptions from the standard rates, which were granted by the arbitrators on the New York Central, apply on the Lackawanna also, whereas the labor leaders claim that the exceptions in the New York Central case are based on local conditions and in no sense apply to the settlement with the Lackawanna.

The Boston & Maine has agreed with its telegraphers to increase their pay about 7 per cent.

Frank J. Ryan, state railway commissioner of Kansas, has been chosen by the telegraphers of the Missouri Pacific as arbitrator in the dispute between the company and themselves concerning wages. The member chosen by the railway company is General Manager A. W. Sullivan, and these two will this week select a third arbitrator.

Charles P. Neill, government mediator, has gone to Houston, Tex., to consider questions at issue between the Southern Pacific and its telegraphers. The government mediators have suspended consideration of a similar dispute on the Seaboard Air Line, but this matter will be taken up again soon.

William Reynolds Vance, dean of the faculty of law at George Washington University, Washington, D. C., has been appointed as the third arbitrator in the controversy between the Southern Railway and its telegraphers. The selection was made by Dr. Neill and Chairman Knapp.

Railway Matters in Washington.

Washington, May 25, 1910.

The railway bill has been discussed in the Senate during the past week on only two or three days, but more progress has been made than in the past, and it is now expected that a vote will be reached this week, or at least in the early part of next week. A long time was spent last week in discussing that provision of the bill which gives the attorney-general charge of the defense of orders of the Interstate Commerce Commission when they are attacked in the courts, and an amendment was finally adopted which requires that the commission shall be notified of the commencement of proceedings and gives it the right to intervene. Individuals, associations and communities interested may also intervene, and the attorney-general shall not discontinue proceedings in the face of an objection by any such party. The section allowing the

Interstate Commerce Commission to delay the adoption of increases in rates was changed so as to allow the commission 120 days in which to act. This week the principal subject of controversy has been an amendment proposed by Senator Cummins making this time practically unlimited. Senator Cummins proposes that no increase shall become effective until approved by the commission. The senator has secured a good deal of support for this proposal, and the insurgents claimed on Monday that they could carry it through. They declared that the notices of intention to advance rates, which have been given out freely by the railways during the past week or two, show conclusively the need of more rigid governmental regulation of this matter. On Tuesday, however, the republicans secured the aid of some of the conservative democrats and proposed an amendment extending the time allowed the commission from 120 days to six months, and it now looks as though this compromise would be substituted for Senator Cummins' proposal. In addition to this, the regular republicans and the democrats are understood to have agreed to cut out the sections of the bill providing for the regulation of stock and bond issues; and with this done, it is expected that the bill can be passed and sent to conference. Senator La Follette still has a long speech unfinished, however.

The Senate, in passing this week the bill to provide for the construction of two new battleships, adopted an amendment to the bill cutting out the clause which allowed contractors, in giving bonds to the government, to deposit railway, county and municipal bonds.

Tentative Rules Adopted for Regulation of Oxy-acetylene Blow-Pipe Industry.

A meeting of manufacturers of apparatus and appliances used in connection with the oxy-acetylene blowpipe was held at the Congress Hotel, Chicago, May 11, 12, 13 and 14. The purpose was to study the rules and regulations drawn by the engineers of the National Board of Fire Underwriters in conjunction with some of the manufacturers to safeguard the industry. There were present forty-three persons connected directly or indirectly with the use of the oxy-acetylene blowpipe principle or with the insurance companies. The conference lasted four days and the rules and regulations proposed were agreed to with but slight modifications. The discussion covered every phase of the construction of every part of the apparatus, as well as its proper location and rate of operation; oxygen production and compression, and subjects relating to the storage of acetylene in cylinders filled with acetone and asbestos.

It was agreed that no apparatus should be permitted to operate at a higher pressure than 15 lbs. to the square inch, unless it should be by means of an approved, water-jacketed, three-stage compressor, compressing into cylinders also approved, not only by the insurance people but by the railway authorities; cylinders to be filled with porous material and acetone. In some cases manufacturers, not realizing the danger of high pressures and hoping to operate the generators more rapidly, had tied down the safety valve so that excessive pressures were likely. It was also agreed that the rules should stipulate that the generator should not be permitted to generate gas too rapidly. A limit was adopted which declared that no generator shall deliver carbide into water unless there shall be one gallon of water to each pound of carbide, and that this carbide must not be fed into the water in less than five hours.

The sub-committee of the National Board of Fire Underwriters, having agreed to these resolutions, further agreed to recommend their adoption by the engineers of the National Board. It is hoped they will go through practically without change.

Pullman Company Resists Reduction of Its Rates.

The Interstate Commerce Commission has extended the time to July 1 in which the reductions made by the commission in Pullman car rates by a former decision become effective. The Pullman Company had filed a petition in the United States circuit court at Chicago on May 18 for a tem-

porary injunction restraining the Interstate Commerce Commission from enforcing its recent order requiring the company to reduce its rates between Chicago and St. Paul, St. Paul and Seattle and other points, and to make its rates for upper berths less than for lower berths. Judge Grosscup set May 25 as the date for the hearing.

In its bill the Pullman Company denies the constitutionality of the provision of the interstate commerce law which makes sleeping car companies common carriers. It states that its business is more in the nature of a hotel keeper than of a transportation line. It claims most of the credit for having developed sleeping cars that are safe, comfortable and convenient, and states that "travelers have never been able to enjoy sleeping car accommodations such as they receive from your orator, except as they have been created and invented by your orator and by its promoters and by others whose rights have been purchased." It states that it never had and does not now have any railway on which its cars are, or have been used, nor any motive power for hauling them, nor any right-of-way over any railway, and is not and never has been a carrier.

British Railway Accidents.

The British Board of Trade has issued its railway accident tables for the last calendar year, from which it appears that only one passenger has been killed in a train accident in the United Kingdom in two years—an unexampled record. The summary is as follows:

Great Britain and Ireland, 1908 and 1909.

	Year, 1909		Year, 1908	
	Killed.	Injured.	Killed.	Injured.
Passengers, in train accidents.....	1	390	.....	283
Passengers, other causes.....	82	2,148	102	2,242
Employees, train accidents.....	16	129	6	164
Employees, other causes.....	318	4,599	376	4,976
Other persons, train accidents.....	...	26	...	7
At highway grade crossings.....	63	36	51	44
Trespassers.....	459	133	479	118
Miscellaneous.....	32	131	29	150
Total.....	971	7,592	1,043	7,984

A large portion of the trespassers are suicides; in 1909 nearly one-half.

Give Us "More Taffy and Less Epitaphy"—Stubbs.

J. C. Stubbs, director of traffic of the Harriman system, was one of the speakers at a dinner given at the Blackstone Hotel in Chicago last week by friends of E. O. McCormick, in honor of Mr. McCormick's appointment as vice-president of the Southern Pacific. The title of Mr. Stubbs' talk might have been "Taffy" in the best sense of that word, the tenor of his remarks being that railway officers and employees ought, and in the future must, give the public more civil, courteous and considerate treatment. The following extracts from Mr. Stubbs' talk will be interesting to railway men throughout the country:

"Many years ago I was instructed to write a letter upon a matter in controversy, to be addressed to an officer of another railway company and signed by Mr. Huntington. I knew it was difficult to acceptably express the ideas of Mr. Huntington, hence took great pains and thought I was successful. The documents fairly bristled with points, every one of which was intended to pierce the other party's position. It was great 'I' for our side, and a very little 'U' for his.

"With some pride the letter was presented for signature, when, to my amazement and humiliation, a pen was drawn through all the pointed paragraphs, and I was instructed to try again. I protested that the letter stated only the truth. The reply was: 'That may be. A man may be a liar. He may know it. Yet it would be unwise to tell him so and seldom wise to let him suspect that you thought so.' That letter was revised three, and written four times before it was signed. The trouble was I did not understand the value of pleasing manners in a controversy. When approved, the letter was a great 'U' and small 'I.' The controversy was steadily and agreeably settled. This was not 'craft,' but was the kind of 'taffy' I am speaking about.

"Persuasion is the strongest force in society to-day. It is

the style and power of the pulpit, the forum, the shop and the market place. One cannot easily be persuaded to adopt your doctrine, or give you the desired verdict, or to buy your goods, or even to give you superior service, unless he feels that you count him worthy of something better than you ask him to be or to do. He will deny as a duty or a right what he will freely grant as a privilege or favor; hence this kind of taffy, as the art of making others pleased with themselves, has a definite social and commercial value.

"It has come to pass that a pleasant smile, agreeable manners, the things that are summed in the term 'good address,' afford a fair start to fortune in any walk of life. Why is it so? Is it not because they are peculiar to talent or sagacity or that they are always or even often associated with great industry or energy? Is it because they operate agreeably upon others. The good-natured possessor of these happy gifts, without seeming effort, unconsciously it may be, feeds the customer or client with the sweet 'taffy' of good will, which inspires its object with a consciousness of worth and importance, makes him larger and better in his own eyes, and is much more effective than spoken compliments.

"The merchant seeks for such qualifications as much in the clerk who sells tape and needles as in the salesman who jobs goods to the value of many thousands of dollars a year.

"The lawyer addresses the court with a deference which sometimes amounts to burlesque when the mental and physical stature of the men are contrasted. He talks to the jury in a confidential tone as though he were counseling with friends in full sympathy with his views and aims.

"The preacher no longer teaches depravity of man and threatens him with eternal burning. His theme is: 'God so loved the world.' He exalts man, lifts him up as the object of Divine love, and pictures to him the joys of the future state.

"Railway managers admonish their employees that patience and politeness, those obliging attentions which elevate their object in his own esteem, are to characterize all their official intercourse with the public. Even in resistance they must strive to please. I am aware that there is little new in the foregoing. Many present are like the speaker, they know but they fail to do.

"When they would do good, evil is present with them. I have chosen the topic to emphasize and energize what is known and believed by us all. Because we have fallen upon new times. The changed conditions under which we shall hereafter conduct the enormous business interests which railway transportation represents, imperatively call for the exercise of the persuasive faculty in every department of the service, particularly those officers who must meet the public and answer its complaints before commissions and courts. I deny that the statutes we are facing and the more extreme measures which we shall yet face are most of them well timed, or that all of them are wholly just. Nevertheless they can be amended or prevented in one way only. By changing public sentiment. That can be done by the tactics of the Huntington letter to which I referred.

"The guest of the evening was chosen for his new position because he has given abundant evidence of fitness for a difficult work under these new conditions. His spirit of comity and disposition to friendly intercourse with his fellowmen are attested by this fine compliment which you are paying him to-night. It stamps your approval upon the judgment of the officer who nominated him and the directors who appointed him. His fellow officers have therefore a share in your compliment, and for them I thank you heartily, and for you and for us all, according to the definition I have given of my text, I shall ever pray:

"Give us more Taffy
And less Epitaphy."

Transportation and Car Accounting Officers.

This association will hold its summer meeting at the Antlers' Hotel, Colorado Springs, Colo., June 21 and 22. Reports on the following subjects will be presented by the various committees: Car service and per diem, office methods and accounting, handling railway business mail, conducting freight transportation, conducting passenger transportation, and joint interchange and inspection bureaus.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting

- AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.
AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Scranton, Pa.; June 17; Omaha, Neb.
AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—C. M. Burt, Boston, Mass.; next meeting, St. Paul, Minn.
AMERICAN ASSOC. OF LOCAL FREIGHT AGENTS' ASS'NS.—G. W. Dennison, Penna. Co., Toledo, Ohio.
AMERICAN ASS'N OF RAILROAD SUPERINTENDENTS.—O. G. Fetter, Carew Bldg., Cincinnati, Ohio; during first week in month.
AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 24 Park Place, New York.
AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago; Oct. 18; Fort Worth, Tex.
AMERICAN RAILWAY ENGINEERING AND MAINT. OF WAY ASSOC.—E. H. Fritch, Monadnock Bldg., Chicago.
AMERICAN RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis; second Tuesday, May; Memphis, Tenn.
AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony Building, Chicago; June 20-22; Atlantic City.
AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—O. T. Harroun, Bloomington, Ill.; July 12; Chicago.
AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. Edgar Marburg, Univ. of Pa., Philadelphia; June 28-July 2; Atlantic City.
AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., N. Y.; 1st and 3d Wed., except July and August; New York.
AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 29th St., N. Y.; 2d Tues.; N. Y.; May 31-June 3; Atlantic City.
AMERICAN STREET AND INTERURBAN RAILWAY ASSOCIATION.—H. C. Donecker, 29 W. 39th St., New York.
ASSOCIATION OF AM. RY. ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; June 29, 1910; Colorado Springs.
ASSOCIATION OF RAILWAY CLAIM AGENTS.—E. H. Hemus, A. T. & S. F., Topeka, Kan.; May 25-27; Chattanooga, Tenn.
ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, Wis. Central Ry., Chicago; June 20-24, 1910; Los Angeles.
ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 24 Park Pl., N. Y.; June 21-22; Colorado Springs.
BUFFALO TRANSPORTATION CLUB.—J. N. Sells, Buffalo.
CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tues. in month, except June, July and Aug.; Montreal.
CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, Montreal, Que.; Thursdays; Montreal.
CAR FOREMAN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month; Chicago.
CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo.
ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.; June 1-4; Harrisburg.
ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton Building, Pittsburgh; 1st and 3d Tuesdays; Pittsburgh.
FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich., Fred. & Pot. R. R., Richmond, Va.; June 15, 1910; California.
GENERAL SUPERINTENDENTS' ASSOC. OF CHICAGO.—H. D. Judson, 209 Adams St., Chicago; Wednesday preceding 3d Thurs.; Chicago.
INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., N. Y.; May 24-27; Niagara Falls, Ont.
INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago; May 23-26; Chicago.
INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, D. & I. R. Ry., Two Harbors, Minn.
INTERNATIONAL RAILWAY MASTER BLACKSMITHS' ASS'N.—A. L. Woodworth, Lima, Ohio; Aug. 16-18; Detroit, Mich.
INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11, Brussels; July 4-16; Berne, Switzerland.
IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August; Des Moines.
MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony Bldg., Chicago; June 15-17; Atlantic City.
NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tues. in month, ex. June, July, Aug. and Sept.; Boston.
NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.
NORTH-WEST RAILWAY CLUB.—T. W. Flanagan, Soo Line, Minn.; 1st Tues. after 2d Mon., ex. June, July, August; St. Paul and Minn.
OMAHA RAILWAY CLUB.—A. H. Christiansen, Barker Bldg.; 2d Wed.
NORTHERN RAILWAY CLUB.—C. L. Kennedy, C. M. & St. P., Duluth; 4th Saturday; Duluth, Minn.
RAILROAD CLUB OF KANSAS CITY.—Third Friday in month; Kansas City.
RAILWAY ASSOCIATION OF SPECIAL AGENTS AND POLICE OF U. S. AND CANADA.—May 10-13; Los Angeles, Cal.
RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City; Third Friday in month; Kansas City.
RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 12 North Linden St., Bethlehem, Pa.; annual meeting October 11-13, Atlantic City.
RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C., Collingwood, Ohio.
RICHMOND RAILROAD CLUB.—F. O. Robinson; 2d Monday; Richmond.
ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.
ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.
SOCIETY OF RY. FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Sta., Chicago.
SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. R. Ry., Montgomery, Ala.; annual, Oct. 20; Atlanta.
SOUTHERN & SOUTHWESTERN R.R. CLUB.—A. J. Merrill, Prudential Bldg., Atlanta; 3d Thurs., Jan., Mar., July, Sept. and Nov.; Atlanta.
TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August; New York.
TRAIN DESPATCHERS' ASSOC. OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago; June 21; Spokane, Wash.
TRANSPORTATION CLUB OF TOLEDO.—L. G. Macomber, Woollen Spice Co., Toledo.
TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo; annual meeting, Aug. 16-19; Niagara Falls, Ont.
WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg; 2d Monday, except June, July and August; Winnipeg.
WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, Monadnock Bldg., Chicago; Wednesdays, except July and August; Chicago.

Traffic News.

The Central of New Jersey has announced new tariffs for suburban season tickets to and from New York, to take effect July 1, which show increases of about 3 per cent., in most cases not over 25 cents a month.

The decrease in shipments over the New York, Ontario & Western is due to the fact that that company no longer carries freight to the West at less than the standard rates. New York reporters hear that the other lines have recompensed the Ontario for this loss by allowing it to take a larger share of certain eastbound traffic.

The Great Northern has applied to the United States circuit court at St. Paul for an injunction against the enforcement of the recent order of the Interstate Commerce Commission reducing the charges for berths in the sleeping cars of the company. Action of the Pullman Company, similar to this, is reported elsewhere.

A press despatch from Austin, Tex., says that the railways will apply to the courts for injunctions against the enforcement of the order of the State Railroad Commission reducing freight rates on cotton. It is declared that the reduction, which in most cases amounts to four cents per 100 lbs., will mean a loss of \$1,000,000 a year to the railways.

The New York, New Haven & Hartford is now taking freight from New York City to the West by way of New Haven. The freight moves from New York to New Haven by boat and thence by rail, by way of the New Haven and the Boston & Maine, to Newport, Vt., where it is delivered to the Canadian Pacific. It is said that 30 cars a day are being moved over this route.

The New York, New Haven & Hartford is preparing new tariffs for passenger fares on branch lines and for some short distance trips on main lines, which, it is said, will show increases from 2 cents a mile to $2\frac{1}{4}$ and $2\frac{1}{2}$ cents. The announcement seems to indicate that for long distance rides on the main lines the present rate of approximately 2 cents a mile is to be continued.

The agencies of the Colorado Midland outside of Colorado, with the exception perhaps of the one at Salt Lake City, will be closed about July 1, and thereafter its interests will be looked after by the agencies of the Chicago, Burlington & Quincy. The Colorado Midland has outside agencies at Salt Lake City, San Francisco, Chicago, New York, Los Angeles, St. Louis, Pittsburgh, Kansas City and Omaha.

The Wabash Pittsburgh Terminal, in connection with the West Side Belt Railroad, has resumed the running of regular passenger trains over the West End Belt Line to and from Clairton, Pa. For the past two years this road has been used only for freight. There is one train a day each way between Pittsburgh and Clairton, 21 miles; two trains between Pittsburgh and Bruceton, 12 miles, and three trains between Pittsburgh and Castle Shannon, 7 miles.

A press despatch from Albany, N. Y., says that two banks in that city hold drafts aggregating \$377,000 against an insolvent grain firm, which are based on false warehouse receipts. According to the accounts, these warehouse receipts, which do not represent goods either in storage or in transit, have been foisted on the banks by a conspiracy between a local freight agent of the Delaware & Hudson Co., who was discharged a month ago, and a representative of the firm of grain dealers which is involved.

A controversy has arisen between some of the railways and the larger live stock shippers in regard to the space in the cars which must be afforded animals in transit in order to make unloading unnecessary and still comply with the 28-hour law. When animals have proper food, water, space and opportunity to rest they are not required to be unloaded. The Department of Agriculture having been appealed to by both railways and shippers, has announced tentatively that if cars are not loaded beyond the minimum weight fixed by the tariffs the department will not, for the present, raise the question as to whether sufficient space is provided for the

animals to rest; but it is the intention of the department to institute a number of test cases and secure rulings from the federal courts as to what space must be afforded. The Secretary of Agriculture holds that where live stock is not unloaded en route "into properly equipped pens for rest, water and feeding" the cars must be provided with facilities for feeding and watering in transit, and animals must, when so fed and watered, receive proper feed and water.

The total shipments of freight over the trunk lines from New York to Buffalo and Pittsburgh and beyond in the month of March amounted to 182,792 tons, as below:

March—	1910—		1909—	
	Tons.	P. c.	Tons.	P. c.
New York Central.....	37,050	20.3	27,257	15.3
Pennsylvania	34,002	18.6	32,633	18.3
Erie	22,820	12.5	19,733	11.1
Baltimore & Ohio.....	15,646	8.5	13,965	7.8
West Shore	7,898	4.3	9,497	5.3
Lackawanna	24,440	13.4	19,544	10.9
Lehigh Valley	25,800	14.2	15,261	8.5
Ontario & Western.....	9,908	5.5	36,644	20.5
Central of New Jersey..	5,048	2.7	4,081	2.3
Total	182,792		178,625	

Hearing Regarding Coal Rates in Illinois.

The Illinois Railway Commission began a hearing at Chicago on May 23 concerning the advances recently made by the railways in coal rates from mines in southern and central Illinois to Chicago and other points in northern Illinois. The old rates varied from 50 to 95 cents per ton; the new rates vary from 60 cents to \$1.07 per ton; the advances varying from 8 cents to 12 cents. The higher rates become effective June 1. At the hearing on May 23 representatives of the shippers asked that the commission suspend the advances pending an investigation of the books of the railways by expert accountants to ascertain if increases in the expense of operation justify the advances. Representatives of the railways replied that they would be glad to thus open their books to show whether they need the advances if the shippers likewise would open their books with a view to showing that, as alleged in their complaint, they could not afford to pay the higher rates. The representative of the shippers replied that the legal status of the railways and of the shipper were different. Chester M. Dawes, general counsel of the Burlington, retorted that the shippers themselves had invited investigation of their books by asserting in their pleadings that they could not afford to pay the higher rates. Counsel for the Commonwealth Edison Company accepted the challenge of the railways and said it would produce its books.

One of the roads most concerned is the Chicago & Eastern Illinois, and spokesmen for the shippers especially referred to it as a road which is making a large amount of money out of its coal traffic. W. H. Lyford, general counsel for the Chicago & Eastern Illinois, said that the prevalent notion about the profits this road derives from its coal traffic are incorrect. Sixty per cent. of its tonnage is coal, but only 40 per cent. of its earnings are derived from that source. It is true that it pays 10 per cent. dividends on its common stock, but its common stock is only about 10 per cent. of its total capitalization, and its earnings on its total capitalization in 1909 were only 4.45 per cent.

It is probable that the contest over these coal rates will be hard fought and the result of large importance. The advanced rates are much below the maximum coal rates fixed by the commission itself. How low the coal rates from Illinois mines have been in the past is illustrated by the earnings of one of the large roads engaged in this traffic. Its average rate per ton per mile on all traffic last year was 7.89 mills. Its average rate on all commodities except coal was 9.5 mills, and its average rate on coal only 3.9 mills. While coal always moves in carloads and often in trainloads, there is usually no back loading for the empties, so the cost of the service is not relatively very low. The operating ratio of the road in question is about 60 per cent. On this basis the average cost of hauling its traffic, not taking into account fixed charges and dividends, was 4.7 mills, which is substantially less than the average rate it is getting on coal. The roads will present facts of this sort to the commission and are pretty confident of winning their case.

(See also issues of May 6, 13 and 20.)

* Mileage operated on March 31, 1909, 281. † Mileage operated on March 31, 1909, 281. ‡ Began regular operations July 1, 1909.

Car Surpluses and Shortages.

Arthur Hale, chairman of the committee on relations between railways of the American Railway Association, in presenting statistical bulletin No. 71 giving a summary of car

are chiefly on the roads lying in group 2 (Eastern), which shows a total surplus of 27,150 as compared with 7,589 in our last bulletin. Box cars in this group increased 4,686 and miscellaneous cars increased from 674 to 11,179, about one-half of the increase being in coke cars. The coal car

CAR SURPLUSES AND SHORTAGES.

Group	Date.	Number of roads.	Surpluses.				Shortages.			
			Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Box.	Flat.	Coal, gondola and hopper.	Other kinds.
*1—	May 11, 1910.....	8	41	190	476	301	92	304	130	...
" 2—	" 11, 1910.....	23	5,950	231	9,790	11,179	3	12	14	29
" 3—	" 11, 1910.....	25	13,374	634	19,087	3,906	25	25	300	79
" 4—	" 11, 1910.....	10	2,139	3	720	627	15	655	2	...
" 5—	" 11, 1910.....	20	3,168	24	1,542	1,232	5	210	2	...
" 6—	" 11, 1910.....	19	7,764	262	5,762	4,645	936	70	412	412
" 7—	" 11, 1910.....	4	743	100	252	867	...	...	...	...
" 8—	" 11, 1910.....	12	3,299	404	5,760	2,705	...	...	39	3
" 9—	" 11, 1910.....	9	1,570	198	249	1,046	35	...	...	...
" 10—	" 11, 1910.....	22	4,836	831	2,414	6,016	8	80	6	48
" 11—	" 11, 1910.....	5	2,112	206	10	583	...	66	...	726
Grand total		157	44,996	3,083	46,062	33,007	1,119	1,422	905	1,109
						127,148				4,555

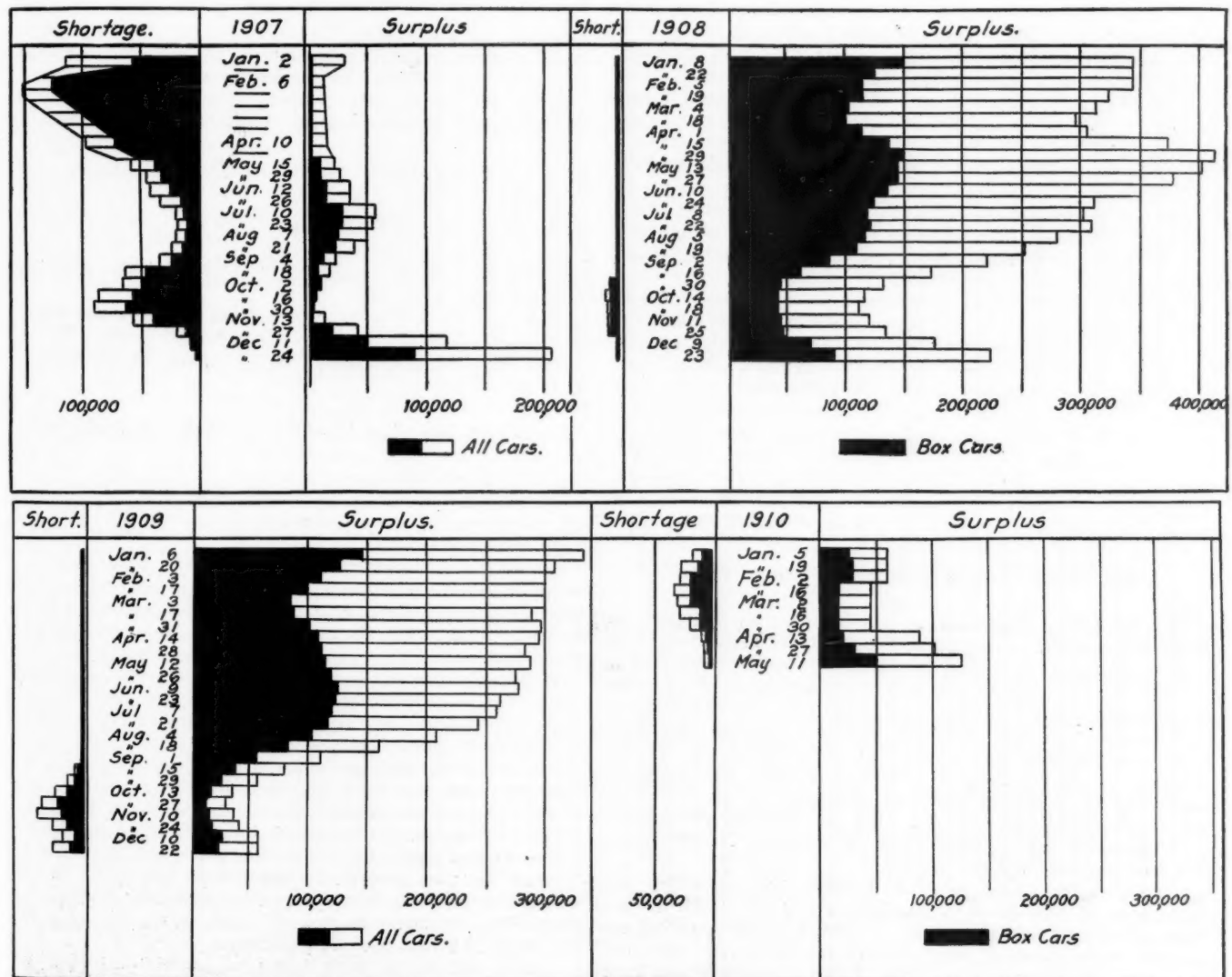
*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin, Minnesota and North and South Dakota lines; Group 7—Montana, Wyoming and Nebraska lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Oregon, Idaho, California and Arizona lines; and Group 11—Canadian lines.

shortages and surpluses by groups from December 23, 1908, to May 11, 1910, says:

"There is an increase in the surplus of 25,063 cars, bringing the total up to 127,148, the highest figure since August, 1909. The box car surplus increased 15,630 and miscellaneous (largely coke and stock cars), increased 9,432. The increases

surplus, while showing little change in the total figures, varied somewhat in the group totals. Group 2 (Eastern), shows a considerable increase in the surplus of this class, while groups 5 (Southern), and 10 (Pacific) report decreases.

"The total shortage is 4,555, a decrease of 1,211 under the figures in our last bulletin."



Car Surpluses and Shortages in 1907, 1908, 1909 and 1910.

The accompanying table gives surpluses and shortages by groups and the diagram shows total surpluses and shortages in 1907, 1908, 1909 and 1910.

Ready-Made Farms.

The "ready-made farms" of the Canadian Pacific in western Canada have proved a great success. A. S. Walter, the agent of the road who conducts to their new homes along the line of the road the parties of immigrants from England, says that these new settlers are greatly delighted with the treatment accorded them. On the 80-acre farms the company had sown 50 acres of wheat before the immigrants arrived, and had also started potatoes and other vegetables.

Some of these English farmers are experts at chicken raising and other specialties. One party of farmers, not finding cattle to their liking, have sent back to England for 60 cows. Where the railway company thus prepares the farms, it also builds churches and school houses, and promises to establish a creamery as soon as one is needed. Next year it is proposed to have a hundred farms—800 acres—prepared for settlers. The irrigation works now being carried out by the Canadian Pacific will cost \$12,000,000. The lands already irrigated have been fully occupied by farmers.

Increase in Rates on Sugar and Coffee.

The trunk lines have canceled their commodity rates on sugar and coffee in carloads from Atlantic seaboard cities to Duluth, St. Paul, Minneapolis, Kansas City, Omaha and points taking the same rates, and beginning June 30 the rates will be increased from 16 to 39 per cent., the fifth class rates applying. Some of the changes are as follows: From New York present rate to Duluth—Sugar, 36 cents; coffee, 31 cents; new (fifth class) rate, sugar, 42 cents; coffee, 42 cents; increase, sugar, 17 per cent.; coffee, 36 per cent. From Boston, present rate to Duluth—Sugar, 38 cents; coffee, 35 cents; new, sugar, 44 cents; coffee, 44 cents. From New York, present rate to St. Paul, Minneapolis, etc.—Sugar, 36 cents; coffee, 33 cents; new, sugar, 42 cents; coffee, 42 cents. From New York, present rate to Kansas City, Omaha, etc.—Sugar, 41 cents; coffee, 39 cents; new, sugar, 53 cents; coffee, 53 cents. Baltimore, present rate to Kansas City, Omaha, etc.—Sugar, 38 cents; coffee, 38 cents; new, sugar, 52 cents; coffee, 52 cents. Philadelphia, present rate to Kansas City, Omaha, etc.—Sugar, 39 cents; coffee, 39 cents; new, sugar, 53 cents; coffee, 53 cents.

At the same time the trunk lines have filed new tariffs from the Atlantic seaboard westward on all import freight, in which the rates from Philadelphia are reduced to the basis of those from Baltimore, thus wiping out the differential in favor of Baltimore. On first class and second class this reduction from Philadelphia is two cents; on the other classes one cent. It is said that these tariffs are to be kept in force until such time next autumn as the Interstate Commerce Commissioners, acting as arbitrators, shall decide the long pending questions about the differentials in these tariffs from the different cities.

Controversy Over Advances in Freight Rates.

The committee appointed by the meeting of shippers at Chicago last week to conduct a campaign against advances in freight rates has instructed its chairman and secretary to ask the officers of the railways in Official Classification territory for a conference on the question of submitting the advances in rates proposed by these roads to arbitration by the Interstate Commerce Commission. In reply to the telegram sent by the shippers to James McCrea, president of the Pennsylvania, regarding the proposed advances in rates, calling his attention to the fact that in October, 1909, he said that the eastern railways were not contemplating advances in freight rates. Mr. McCrea answered as follows:

"The statement made by me in October, 1909, to which you refer was in answer to a communication addressed to me from Cincinnati and signed by a number of the trades associations represented at your meeting, and correctly presented the situation existing at the time. Since then conditions have materially changed in respect to the further increase in wages and materials and consequent cost of operation. Our company

has recently had the question under consideration and it is quite probable an advance in some rates will be made."

T. A. Griffin, president of the Griffin Wheel Company, has prepared a petition which is being circulated among shippers in Chicago, especially railway supply concerns, opposing a campaign against any advances in rates. The statement by Mr. Griffin is in part as follows:

"We recognize the fact that our business is largely affected by the amount of material that railways purchase, which is now reduced to a minimum and at consequently minimum prices, because their net earnings are and will be reduced by the great increase in operating cost, and it is almost impossible on their prospective earnings to present a good reason to investors to purchase their securities or make loans. The only way to change this situation is to increase their earnings by an advance in rates.

"We do not indorse or advocate unreasonable advances, but we deprecate any movement in opposition to the proposed advances that is based upon a denial of business reasons or puts forth deductions that are misleading, incorrect, or unfair, as has been done."

Mr. Griffin has written a letter to members of the Illinois Manufacturers' Association, to which he belongs, expressing similar views.

President Ripley of the Santa Fe in an interview says:

"I do not believe the railroads will gain any benefit from discussing this question, as it seems to make no difference what we say or whether the position we take on rate and revenue matters is sound or not. The shippers seem to constitutionally oppose any increases in rates irrespective of the justice of the railroads' contention. People in other lines of business have increased their selling prices fully 50 per cent. and the price of labor has gone up from 30 to 40 per cent. The public says there shall be no strikes and insists that the railroads shall arbitrate the question of wages. So we are hard hit on both sides. What the shippers stated in their mass meeting regarding increasing net railroad earnings is not true. Net earnings are decreasing everywhere."

Some western shippers propose to hold a mass meeting at Omaha to oppose advances in freight rates in the west.

INTERSTATE COMMERCE COMMISSION.

Reparation Denied.

E. F. Rose et al. v. Boston & Albany et al. Opinion by Commissioner Cockrell.

The L.C.L. rate on motor cycles from points in the East and Middle West to the Pacific coast found unreasonable and a reasonable rate prescribed, but no reparation awarded. (18 I. C. C., 427.)

Rates from the West to Chattanooga Reduced.

Receivers & Shippers Association of Cincinnati v. Cincinnati, New Orleans & Texas Pacific et al. Chicago Association of Commerce v. Pennsylvania Company et al. Opinion by Commissioner Prouty.

In 1894 this commission decided what is known as the *Freight Bureau cases*, 6 I. C. C., 195, and ordered certain reduction in rates from Cincinnati to Chattanooga and other southern points, but the courts declined to enforce this order upon the ground that the commission had no power to fix a future rate. Under the Hepburn Act the commission was invested with such power and thereupon the present proceedings were begun for the purpose of obtaining the benefit of the holding of the commission in the former cases, but only the rates from Chicago and Cincinnati to Chattanooga are involved. On the facts disclosed by the record, it is held that it is not clearly apparent that rates from the east discriminate against the west, and that, if so, that discrimination under all the circumstances of the case is not undue; but that present rates on numbered classes from Cincinnati to Chattanooga are unreasonable to the extent that they exceed 70 cents first class, 60 cents second, 53 cents third, 44 cents fourth, 38 cents fifth and 29 cents sixth class.

There can be no such thing as judicial estoppel in the proceedings of this commission, since its orders are not judgments nor is it a judicial body. If that principle could be

applied to the decisions of the commission it is manifest that it could have no application here, since the parties are not the same as they were in 1894.

It is apparent that if distance is to be taken as the standard, rates from the complaining cities are much higher than from their rival trade centers on the Atlantic seaboard; but where water competition enters as a factor some different basis of comparison than distance must be found.

The testimony shows that while the Cincinnati, New Orleans & Texas Pacific is ordinarily regarded as part of the Southern Railway system, its operation is in fact entirely distinct from that of the Southern Railway. It is certainly doubtful whether in view of the *Commodities cases*, 213 U. S., 366, it can be affirmed that there is such a connection between the Southern Railway and the Cincinnati, New Orleans & Texas Pacific that these two companies can be held responsible under the third section of the act for the rates of one another.

Within certain limits a railway company is bound to protect its territory, and within those limits this commission may consider the rates and their effect upon the movement of traffic. The east and the west find a common market in this section of the south, and in determining whether the present rates from the west are reasonable one subject of inquiry is the movement of traffic under the present rates. The fair inference from the testimony seems to be that the relation in rates between the east and the west which has been in effect for the last third of a century does not to-day abnormally promote the movement of traffic from either section.

Neither the east nor the west has any vested right to sell a certain amount in this southern territory. Each section is entitled to a reasonable rate and to do what business it can under that rate.

In determining the reasonableness of rates from the west to southern territory the interests of all competing lines must be considered and not merely that line which can handle the business cheapest. (18 I. C. C., 440.)

Running of the Law of Limitations.

W. L. Blinn Lumber Co. v. Southern Pacific et al. Opinion by Commissioner Lane.

Two carload shipments of timber were delivered to the Southern Pacific on January 29, and April 11, 1906, at San Pedro, Cal., consigned to Charleston, Ariz. The established rate at that time was \$8.10 per ton. The complainant asks reparation for the difference between \$8.10 per ton and \$4.25 per ton. Complaint was not made until January 6, 1909, but payment of freight charges was not made until January 30, 1907. Defendant claims that the law of limitations barring complaints before the commission as to unreasonable rates charged more than two years before the complaint, begins to run as soon as the shipment has been made. Complainant claims that the law does not begin to run until the freight charges are actually paid. While it is the common law rule that a cause of action does not accrue until actual payment has been made, so that there may be a basis in law for recovery, this rule is necessarily modified as to carriers subject to the provisions of the act to regulate commerce. There can be no waiver on the part of the common carrier of its right to collect its tariff rates; it must on the delivery of a shipment, charge whatever rates its schedules call for or it is guilty under the law of granting a concession effecting a discrimination. A shipper who does not promptly pay the lawful rate accepts at his own risk the fact that the time for the appeal to the commission is running against him. The complaint is dismissed.

Commissioner Harlan concurring:

Irrespective of any private understanding as to the rate, and even if the carrier, through error or otherwise, has misquoted the rate, the acts to regulate commerce impose the obligation on the carrier to collect and on the shipper to pay the published rate. Nothing can excuse any omission of duty in this regard. The gist of this proceeding is an attack on the unlawfulness of the published rate, and there can be no recovery of damages except on a finding in support of that allegation. The wrong done the shipper with respect to shipments already made arises out of the publication by the carrier of an unlawful rate. The bar of the law of limitations, therefore, begins to run when the obligation of the

shipper to pay the unlawful rate has become a completed obligation.

Commissioner Cockrell dissenting:

I am unable to concur in the report of the commission in this case. I can find no provision in the interstate commerce law requiring carriers to collect the lawful tariff charges on the delivery of the shipment or to refuse an extension of time to the shipper for paying the charges. The law of limitations is very plain: "All complaints for the recovery of damages shall be filed with the commission within two years from the time the cause of action accrues." The phrases "recovery of damages" and "cause of action accrues" are perfectly plain and well defined terms of law, and they are to be interpreted in the reasonable sense, such as must have been in the mind of the legislature when they were used. The commission in January, 1908, said: "A cause of action accrues, as the phrase is used in the act, on the date the freight charges are actually paid." It would have been better if Congress in framing the law of limitations had said "within two years from the time the shipment is delivered." To the essential intent of the report in this case I should give my hearty approval if the same were addressed to Congress, but as a report on a specific case I must dissent. Commissioner Prouty also dissents. (18 I. C. C., 430.)

Blodgett Milling Co. v. Chicago, Indiana & Southern et al. Opinion by Commissioner Lane.

Complaint dismissed because barred by the statute of limitations. See *Blinn Lumber Co. v. Southern Pacific* above. Commissioners Prouty and Cockrell dissent.

Effect of State Rate on Interstate Rates.

E. E. Saunders and T. E. Welles doing business as E. E. Saunders & Co. v. Southern Express Co. Opinion by Commissioner Harlan.

Mobile, Ala., and Pensacola, Fla., are situated on the gulf of Mexico, about 54 miles apart, and for a number of years have been competitors in Alabama territory for the sale of fish. Pensacola has of late years gotten considerably the greater part of this business through the adoption of more up-to-date methods of catching and handling the fish. The defendant express company had until recently the same rate from Mobile to Selma, Montgomery, and other points in Alabama as from Pensacola. The State Railroad Commission of Alabama recently ordered a reduction in the rate from Mobile to Alabama points and the complainant in this case doing business in Pensacola asks a reduction in the rates on fish from Pensacola, claiming that the defendant discriminates against Pensacola in favor of Mobile.

The defendant says that it protested against the action of the state commission in reducing its rate out of Mobile, and it claims that the Mobile rate is unjust. The reasonableness of Pensacola rates in themselves is not questioned in this case, but the commission, from investigation of its own, is convinced that no reduction that the commission could fairly require the defendant to make would do more than merely modify the discrimination in the defendant's rates of which complaint is made.

While the defendant's general merchandise rate on express matter between Mobile and Birmingham is \$1.20, its fresh fish rate under the order of the state commission is but 55 cents per 100 lbs. The Interstate Commerce Commission, from a rather wide knowledge of fish rates, concludes that the rates out of Mobile are lower than the commission would feel justified in requiring the defendant to maintain on fish shipments out of Pensacola to the same points. While on general principles of comity the action of the state commission in fixing a rate on state traffic must be treated with all due respect * * * from what has been said, it is clear that with all the light on the question that the record and our own investigation give us, we cannot accept the Alabama rates as a fair basis for fixing the defendant's rates to the same points from Pensacola. Since the defendant's state rates are held down under compulsion of an order by the state commission, an order by this commission (the I. C. C.) requiring it to desist from the resulting discrimination against Pensacola would be equivalent to an order requiring the defendant to reduce its Pensacola rates to the level of the state rates out of Mobile. The Pensacola fish dealers appear to

be without present redress before this commission so far as the discrimination complained of is concerned. Whatever authority may be vested in the courts for the redress of such wrongs, it seems reasonably clear that this commission may not lawfully interfere with an order effecting the rates imposed on the defendant by order of the Alabama commission. It is not altogether clear that existing legislation affords redress against a discrimination as between two points situated as Mobile and Pensacola are when the discrimination results from an order by a state commission. But unless some such power is lodged somewhere under appropriate legislation, it is evident that state-made rates, if established in pursuance of a narrow or selfish local policy, may not only hinder and harm interstate traffic, but may, if adjusted with that end in view, take from a point in another state a business that naturally belongs to that point or in which it is entitled at least to participate, on the basis of equal rates and equal opportunity.

The defendant is one concern and one instrument of commerce operating through and across those invisible lines that separate the several states from one another. If it voluntarily makes a distinction between traffic that moves from a point in one state to a point in another state and traffic that moves between points in the same state, and gives to the state traffic lower rates than to the interstate traffic moving under substantially similar conditions, it imposes on the latter a burden that it ought not justly to bear, and it discriminates against one community in favor of another. The same burden and discrimination follow if instead of voluntarily so adjusting its rates it is compelled so to adjust them by the action of a state commission. It may be that this anomaly in transportation necessarily results from our dual system of government and that a remedy is beyond reach without some amendment to the national constitution.

It may be, but on that point we express no opinion, that the Congress may constitutionally protect interstate commerce, as well as the carriers that are engaged in interstate transportation, by requiring that any state traffic moved by such a carrier shall bear its just proportion of the cost of operation and yield its proper proportion of profit to the carrier; and that with such an end in view it may authorize this commission to fix minimum rates, at least, for state traffic when moved by carriers engaged also in interstate transportation; or that it may provide that no carrier engaged in the interstate transportation of passengers or property may at the same time carry state traffic at rates that are less than the rates exacted by it for interstate carriage of like distance and under like transportation conditions. It has, however, not attempted any such legislation, and whether such an enactment would stand the test of scrutiny by the courts under the constitution as it now stands, and if so, whether it would be desirable from the standpoint of a broad public policy, are questions that must ultimately be determined by the legislative power and therefore cannot profitably be discussed by the commission in this proceeding.

Notwithstanding what has been said we shall not close this record until advised of the result of the defendant's further efforts in its attempt to get the state commission's order in regard to Mobile rates modified. (18 I. C. C., 415.)

STATE COMMISSIONS.

The New York Public Service Commission, First district, has decided that the railways operating ferryboats from Jersey City terminals to New York and doing no other transportation business within the state of New York are not under the law required to make returns as to accidents on these ferryboats. The commission, following in general the argument of the supreme court in the Covington Bridge Co. v. Kentucky case, holds that the operation of the ferryboats is already under the jurisdiction of the federal authorities and the state railway commission does not need to regulate this traffic.

COURT NEWS.

The supreme court of Nebraska has handed down a decision holding it illegal for a railway to pay for newspaper advertising by giving transportation.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

John F. Stevens, president of the Oregon Trunk Line, has been appointed also general manager of the Oregon Electric Railway Co.

G. W. Martin has been elected vice-president and general manager of the Phillipsburg & Susquehanna Valley, with office at Phillipsburg, Pa.

A. D. Bethard, assistant general manager of the Missouri, Kansas & Texas of Texas, at Dallas, Tex., has been appointed vice-president and general manager.

J. W. Mulhern, whose resignation as superintendent of the Chicago & Alton at Bloomington, Ill., has been announced in these columns, has been appointed assistant to the second vice-president and general manager of the Western Pacific, with office at San Francisco, Cal.

William F. Dickinson, whose appointment as general attorney of the Chicago, Rock Island & Pacific, with office at Chicago, has been announced in these columns, was born in Rockford, Ill., in 1877. He took his A.B. degree at the University of Wisconsin in 1901 and graduated in law from the same university in 1903. He entered railway service as assistant to the commerce counsel of the Chicago, Rock Island & Pacific, March 13, 1907. In 1909 he was made eastern attorney, with office in New York, the position he leaves to become general attorney.

Operating Officers.

J. H. Johnson has been appointed a trainmaster of the Northern Pacific at Mandan, N. Dak.

J. C. Muir has been appointed general superintendent of the Evansville & Terre Haute, succeeding J. O. Crockett, resigned.

F. C. Hutchinson, chief clerk to general manager of the Northern Pacific, at St. Paul, Minn., has been appointed a trainmaster, with office at Mandan, N. Dak.

Thomas R. Limer has been appointed superintendent of transportation of the Hocking Valley. The position of superintendent of car service having been discontinued.

C. M. Bryant, superintendent of the Missouri, Kansas & Texas of Texas, at Smithfield, Tex., has been appointed assistant general manager, succeeding A. D. Bethard, promoted.

W. A. Durham has been appointed assistant general manager of the Missouri, Kansas & Texas, with office at St. Louis, Mo. His former position, general superintendent in Texas, has been abolished.

W. S. Anderson has been appointed car service agent of the Oregon Short Line and Southern Pacific Lines East of Sparks, with office at Salt Lake City, Utah, succeeding A. F. Brewer, transferred.

W. R. Hudson has been appointed general superintendent of the Norfolk Southern, in charge of operation and maintenance, and C. P. Dugan, car accountant, has been appointed superintendent of transportation, both with offices at Norfolk, Va. The office of car accountant has been abolished.

Traffic Officers.

John Bickel has been appointed commercial agent for the Duluth, South Shore & Atlantic at Chicago.

Ira F. Kurtz has been appointed a traveling freight agent of the Lehigh Valley, with office at South Bethlehem, Pa.

Robert S. Ruble, city passenger agent of the Union Pacific at Omaha, Neb., has been appointed assistant general passenger agent, with office at Omaha.

M. J. Allen has been appointed a commercial freight agent of the Baltimore & Ohio and the Baltimore & Ohio Southwestern, with office at Kansas City, Mo.

J. H. C. Clark has been appointed a traveling agent, freight department, of the Erie Railroad, with office at Chicago, succeeding S. M. Wilcox, assigned to other duties.

W. H. Davidson, assistant ticket agent of the Atchison,

Topeka & Santa Fe at Dallas, Tex., has been appointed city passenger and ticket agent of the St. Louis & San Francisco.

B. W. Redfearn, general dairy agent of the St. Louis & San Francisco at St. Louis, Mo., has been appointed general perishable freight agent in charge of dairy and perishable freight traffic, excepting live stock, the position of general dairy agent having been abolished.

F. C. Coley, assistant general passenger agent of the New York, New Haven & Hartford, has been appointed first assistant general passenger agent of that company, also of the New England Navigation Co., with office at New Haven, Conn. C. A. Call has been appointed assistant general passenger agent of both these companies, with office at Boston, Mass., and A. H. Seaber, assistant general passenger agent, with office at New York.

W. B. Groseclose, general freight agent of the Missouri, Kansas & Texas, with office at St. Louis, Mo., has been appointed assistant freight traffic manager, with office in Chicago. J. W. Allen, general freight agent of the Missouri, Kansas & Texas of Texas, with office at Dallas, Tex., succeeds Mr. Groseclose. J. L. West, assistant general freight agent of the Missouri, Kansas & Texas at St. Louis, Mo., succeeds Mr. Allen. W. W. Miller, assistant general freight agent at St. Louis, Mo., succeeds Mr. West. E. S. Briggs, assistant general freight agent of the Missouri, Kansas & Texas of Texas, at Houston, Tex., succeeds Mr. Miller. E. H. Coombs succeeds Mr. Briggs.

Engineering and Rolling Stock Officers.

Dean Hinman has been appointed supervisor of tracks of the Chicago Great Western.

W. J. Carnahan has been appointed roadmaster of the St. Louis, Brownsville & Mexico at Kingsville, Tex., succeeding B. F. Lawler, transferred to Bloomington as roadmaster on the Fort O'Connor division.

Marshall Craig, whose resignation as city passenger and ticket agent of the Chicago Great Western at Omaha, Neb., has been announced in these columns, has been appointed assistant engineer of the Waterloo, Cedar Falls & Northern, with office at Waterloo, Iowa.

John D. Maupin, whose appointment as master mechanic of the Trinity & Brazos Valley at Teague, Tex., has been announced in these columns, was born in 1869 at St. Catherine, Mo. He entered railway service in 1887 as a machinist apprentice on the St. Louis, Iron Mountain & Southern. After completing his apprenticeship he served in the mechanical department of the Iron Mountain, the Texas Central, and the Trinity & Brazos Valley, being general roundhouse foreman and general foreman. He left the position of general foreman of the Trinity & Brazos Valley to become master mechanic.

W. P. Hobson, whose appointment as master mechanic of the Cincinnati division of the Chesapeake & Ohio, with office at Covington, Ky., has been announced in these columns, was born June 29, 1863, in Goochland county, Va. He received his education in the public and private schools of Virginia, and began railway work on September 1, 1886, in the Chesapeake & Ohio shops at Huntington, W. Va., as a machinist's apprentice. Four years later he went to Hinton as a machinist, and in April, 1891, was promoted to night roundhouse foreman. Ten years later he was promoted to general roundhouse foreman at Clifton Forge, Va., remaining in this position about three months, when he was made assistant master mechanic on the Huntington division, with office at Hinton. In December, 1904, he was appointed master mechanic of the Kentucky division at Lexington, Ky., and on May 1, 1910, he was transferred to the Cincinnati division.

James S. Sheafe, whose appointment as engineer of tests of the Illinois Central has been announced in these columns, was born in Holden, Mo., October 12, 1876. He graduated in the literary course from the University of Washington, Seattle, Wash., and in mechanical engineering from the Massachusetts Institute of Technology. He entered railway service as a freight brakeman on the Northern Pacific in May, 1897. He held numerous minor positions until 1903, when he entered the South Tacoma shops of the Northern Pacific as a special apprentice. In 1904 he entered the service of the Great Northern, serving that company as draftsman

and later as locomotive foreman. In 1906 he went to the Illinois Central as machinist at McComb, Miss., was soon made general foreman at Indianapolis, Ind., and in 1907 was appointed mechanical inspector at Chicago, the position he leaves to become engineer of tests.

Purchasing Officers.

William A. Summerhays, whose appointment as general storekeeper of the Illinois Central, with headquarters at the Burnside shops, Chicago, has been announced in these columns, was born in Chicago, August 11, 1879. He entered railway service in the maintenance of way department of the Illinois Central, June 15, 1898. He was made assistant general storekeeper in charge of maintenance of way and signal material in November, 1901, and held that position until his recent appointment.

OBITUARY.

George S. Sinclair, auditor of receipts of the Missouri, Kansas & Texas, with office at St. Louis, Mo., died May 17 from a stroke of apoplexy. He was 46 years old and had served the Missouri, Kansas & Texas for about 22 years.

John Rooney, a former president of the Boston, Hartford & Erie, now a part of the New York, New Haven & Hartford, and for many years connected with railway and electrical work, died May 18 at his home in Brooklyn, N. Y., at the age of 71 years. Mr. Rooney was born in the north of Ireland, and after coming to America he studied law, and then entered railway work, having been connected at various times with the Southern Minnesota, the Iowa Eastern and then with the Boston, Hartford & Erie. After leaving railway service Mr. Rooney was connected with several electrical companies which have been absorbed by the Westinghouse Electric & Manufacturing Co.

Charles H. Platt, formerly general superintendent of the Western district of the New York, New Haven & Hartford, died May 20 in New York City. Mr. Platt was born May 30, 1850, at Stepney Depot, Conn., and began railway work in 1868 with the Housatonic Railroad, now a part of the New York, New Haven & Hartford, as agent and operator at his native town. In 1872 he was appointed general freight and passenger agent of the Shepaug Railroad, and two years later he was made superintendent of the same road. In 1881 he went to the New York & New England and was made superintendent of construction on the Western extension. Both of these roads are now included in the New York, New Haven & Hartford. In November, 1889, he was appointed general manager of the Grand Central Depot, New York City, and remained there three years. In June, 1892, he was appointed general superintendent of the New York, New Haven & Hartford, and in July, 1898, on the reorganization of the operating department he was made general superintendent of the Western district. Since his retirement from that office in 1903 Mr. Platt had lived in New York City.

Richard Price Morgan, consulting engineer, who has for many years been recognized as an authority in the construction of railways, died at his home in Dwight, Ill., May 20. Mr. Morgan was born in Stockbridge, Mass., September 17, 1828. He was the son of a veteran engineer who bore the same name. Mr. Morgan entered railway service as a rodman on the Hudson River Railway during its construction. He was one of the early railway commissioners of Illinois, and served on many other commissions of a public and private character; made the plans for the first design for an elevated railway in New York, a beautifully designed steel gothic arch for Broadway; was the chief factor in the building of the Chicago & Alton, and was its first general superintendent. He was a trustee of the University of Illinois, from which he received the degree of Doctor of Engineering. He was intimate with Abraham Lincoln during the time that he was engaged in building the Chicago & Alton through central Illinois. The Prince of Wales on the occasion of his visit to this country in 1860 was entertained at Mr. Morgan's home in Dwight. Mr. Morgan is survived by two sons, one of whom, Dwight C., is vice-president and general manager of the Pittsburgh, Shawmut & Northern.

Railway Construction.

New Incorporations, Surveys, Etc.

ALTUS, WICHITA FALLS & HOLLIS.—See Wichita Falls & Northwestern.

ARIZONA EASTERN.—See Phoenix & Buckeye.

ASHERTON & GULF.—According to press reports work is to be started at once on an extension of this road from Asherton, in Dimmit county, Tex., west to Eagle Pass. Plans are being made to build an extension from the eastern terminus at Artesia east to a point on the Gulf of Mexico, probably at Corpus Christi, about 150 miles. (April 29, p. 1113.)

CAMDEN & TRENTON TRACTION.—Incorporated in New Jersey, with \$675,000 capital, to operate an electric line from Trenton, N. J., south to Camden. The incorporators are: F. Evans, E. A. Martin and C. R. Renz, and are said to be the owners of the Camden & Trenton Street Railway.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—Grant Brothers, Champaign, Ill., are said to be carrying out double-tracking work between Anderson, Ind., and Pendleton. Costello Brothers, St. Louis, Mo., the contractors, sublet the work to Grant Brothers.

DALLAS-CLEBURNE INTERURBAN.—An officer writes that it is uncertain when work will be started on this line. The projected route is from Dallas, Tex., southwest via West Dallas, Eagleford, Cain, Webb, Mansfield, Lillian, Alvarado and Moss-ton to Cleburne, about 50 miles. The work includes putting up a large bridge over the Trinity river, and a large power house is also to be built. G. C. Hamington, president, Indianapolis; Joseph Edwards, chief engineer, Mansfield. (See Texas Roads, May 13, p. 1237.)

DENISON & PACIFIC SUBURBAN.—Organized in Texas to build a number of suburban electric lines to points on the Texas & Pacific in Texas. L. S. Thorne, president; W. Cumming, vice-president, Dallas.

ELIZABETHTOWN & TRENTON.—Incorporated in New Jersey, with \$250,000 capital, to operate a line from Milltown, N. J., via New Brunswick, to Elizabeth. The directors include: I. Shupp, Jr., Philadelphia; C. L. Rihl, C. A. Entekin, Ardmore, Pa.; J. W. Kelly, A. E. Garwood, H. H. Aikens, Llan-erch, Pa., and J. R. Turner, Basking Ridge, N. J.

ELIZABETHTOWN TERMINAL.—This company has given a mortgage to secure an issue of \$150,000 of bonds. The company was incorporated in September, 1909, in New York, with a capital of \$80,000, to build from Westport, N. Y., on the Delaware & Hudson, west to Elizabethtown, eight miles, and work is now under way. V. R. Coon, general manager, Elizabethtown. (May 6, p. 1183.)

EMPORIA & AHOSSKIE.—A company is being organized and expects to ask for a charter this month. Most of the right-of-way has been secured for a line from the Atlantic Coast Line at Emporia, Va., southeast via Margarettsville, N. C., Pendleton and Murfreesboro to Ahooskie, 54 miles. The work will include three small bridges. W. S. Goodwyn, Emporia, may be addressed.

GULF, COLORADO & SANTA FE.—An officer writes that a contract has been given to J. T. Shortall, Kansas City, Mo., for grading work between Temple, Tex., and Lometa. The amount of this work is about 800,000 cu. yds. (May 13, p. 1236.)

GULF, TEXAS & WESTERN.—The last spike has just been driven on the first 75 miles, which completes the construction of this line from Seymour, Tex., east to Jacksboro, affording connections via the Rock Island at Jacksboro from Seymour to Fort Worth and Dallas. The line is to be extended east to Dallas with a branch to Fort Worth, and will be extended on the west to a connection with the Santa Fe at Lubbock. (Dec. 3, p. 1107.)

IOWA CITY, OTTUMWA SOUTHWESTERN (ELECTRIC).—Incorporated in South Dakota, with offices at Pierre, S. Dak., and Iowa City, Iowa, to build from Iowa City southwest to Ottumwa, 70 miles. An officer writes that a contract has been

given to A. Steffen, Davenport, Iowa, to build the line. F. Tanner, vice-president, Iowa City. (Dec. 17, p. 1213.)

KANSAS, OKLAHOMA & PANAMA.—Incorporated in Oklahoma, with \$1,000,000 capital, to build from Liberal, Kan., south through Beaver, Harper, Woodward, Ellis, Roger Mills, Beckman, Greer, Jackson and Tillman counties, in Oklahoma, with a branch from Sayre, Okla., east to Oklahoma City. The headquarters of the company will be at Sayre. R. W. Ruffin, Hamilton; J. W. Lytle, W. F. Crawford, Indianapolis, Ind.; D. B. Richardson, J. A. Whitehurst, G. L. Bennett and D. W. Mann, Sayre, are interested.

LACLEDE, DALLAS & WESTERN.—A contract is said to have been given to Davis & Blair, Joplin, Mo., to build from Phillipsburg, Laclede county, Mo., west to Buffalo, Dallas county, 22 miles. The line is eventually to be continued west of Buffalo for eight miles. B. B. Joffe, president; H. W. Smith, chief engineer, American Bank building, Kansas City. (May 13, p. 1237.)

MARIETTA, COLUMBUS & CLEVELAND.—This company, operating a 49-mile line from Marietta, Ohio, west, thence northwest to Palos, with a branch to Sharpsburg, is said to have surveys made for an extension from the present terminus at Palos south to Athens, about 16 miles. Connection is to be made at Athens with the Hocking Valley.

MEXICAN ROADS.—According to press reports from Mexico City, Leandro Fernandez, representing the Department of Communications and Public Works, and Lic. Francisco Alfaro, representing A. B. Adams, Incorporated, have entered into an agreement for the construction of a railway from Puebla south via coal mines at Tezcatalan and Tlaxiaco, Oaxaca, to Lake Chacahua, near the Pacific coast.

MOOREFIELD & VIRGINIA.—An officer writes that it has not yet been definitely decided to build this line. The projected route is from Moorefield, Hardy county, W. Va., south to Peru, 20 miles. W. Trapnell, general manager, Romney. (May 20, p. 1282.)

NASHVILLE, CHATTANOOGA & ST. LOUIS.—An officer writes that contracts have been given to H. H. Thrasher and L. C. Gunter, Chattanooga, Tenn., at \$90,000, for eight miles of second-track work from Wauhatchie west to Whiteside. The maximum grade will be 1 per cent. and the work will be rather heavy.

NEW JERSEY RAPID TRANSIT.—An officer of the North Jersey Construction Co. writes that work is now under way building a line from Paterson, N. J., north via Fairlawn, Glenrock, Ridgewood, Hohokus, Waldwick, Allendale, Ramsey and Mahwah, to Suffern, N. Y., of which the six miles from Paterson to Hohokus is finished. Contracts have been let for grading, bridges, etc., on the rest of the line to local contractors. All bridges are to be of reinforced concrete and steel construction, including a large bridge over the Erie Railroad and the proposed line of the Erie Terminals Co., which will be an overhead structure, about 1,300 ft. long. Contracts are let and work is now under way on car barns, substations and office buildings. G. G. Bogart, president; E. A. Hoffman, chief engineer, Paterson.

NEW YORK CENTRAL & HUDSON RIVER.—Application has been made to the New York Public Service Commission, Second district, for an order permitting this company to build a detour east of Oneida, N. Y. On the existing main line between Oneida and Verona there is a heavy grade going east, and to avoid this it is proposed to detour track No. 4. The proposed new route intersects three highways in the town of Verona. One of these highway crossings is to be carried under the proposed tracks, another over the tracks, and a portion of the third highway is to be discontinued and travel diverted to one of the other crossings.

Application has also been made for an order to permit the construction of a cut-off on the Rome, Watertown & Ogdensburg division between Watertown, N. Y., and San-fords. It is proposed to construct a double-track line for freight, partly in the town of Pamela and partly in the town of Le Ray. The present main line passes through a thickly populated district of Watertown on the southerly

side of the Black river and Factory street, crossing many highways at grade. The company has recently constructed a new freight house on the north side of the river, and has discontinued its use of the freight house on the south side. The proposed cut-off crosses two highways in the town of Pamela. These are to be carried under the railway, a crossing at the division line between the town of Pamela and Sanfords is to be carried over the railway, and another near Sanfords in the town of Le Ray is to be carried under the railway. The proposed cut-off will lessen the dangers of the grade crossings in the city of Watertown, provide a much better grade and facilitate the operation of through freight trains.

NORTHERN PACIFIC.—According to press reports surveys are now being made south of Ryder, N. Dak., for a line to be built from the present western terminus of the branch at Turtle Lake, N. Dak., west via a point south of Ryder, thence crossing the Missouri river into McKenzie county.

NORTH MISSOURI CENTRAL (ELECTRIC).—An officer writes that a contract has been given to the M. A. Talbott Construction Co., Baltimore, Md., and work is to be started June 6 on a line from Jefferson City, Mo., north to Columbia, 28 miles, thence northeast to Mexico, an additional 31 miles. The company also plans to put up a power house, car barn, three terminals and two substations. O. F. Spaete, 1304 New National Bank of Commerce building, St. Louis, Mo., may be addressed.

OREGON SHORT LINE.—An officer writes that the Salt Lake & Idaho is to be built from Saline, Utah, on the Southern Pacific main line, north to Burley, Idaho, on the Minidoka & Southwestern, 150.49 miles. Maximum grades will be .7 per cent. ascending and .7 per cent. descending. Total ascents westbound, 1,407 ft.; total descents westbound, 1,469 ft. Maximum curvature, 4 degs.; total curvature, 2,304 degs.; total curvature, 30.89 miles. The work to be carried out includes eight steel bridges, to have a total length of 220 ft. There will be 34 pile trestles, aggregating 1,065 ft. W. H. Bancroft, president, and William Ashton, chief engineer, Salt Lake City. (April 22, p. 1066.)

PAYETTE VALLEY.—An officer writes that this company, which operates a 13-mile line from Payette, Idaho, southeast to New Plymouth, is building an extension from New Plymouth southeast to Emmett, 19 miles, under the name of the Payette Valley Extension Railroad. The grading contract has been let to the Northwestern Engineering Co., Emmett, and about one-fifth of the grade has been finished. Eleven cars of rails and spikes are on the ground and ties are being received. The company expects to have the line in operation to Emmett by August 1. (April 22, p. 1065.)

PITTSBURGH & SHAWMUT.—See Pittsburgh, Shawmut & Northern.

PITTSBURGH, SHAWMUT & NORTHERN.—Contracts are said to have been let recently for work on the Pittsburgh & Shawmut, now building from Knoxdale, Pa., to Freeport, as follows: For bridges, including four high viaducts, two crossings of the Mahoning creek, a large bridge over the Allegheny river at Mahoning, and 26 plate girder and "I" beam bridges, to the American Bridge Co. The plans for the bridge over the Allegheny river at Mahoning have already been approved by the Secretary of War. The structure is to have a channel span, 400 ft. long, and three shorter spans, each 200 ft. Contracts for the construction of branch lines to Oakland and to Tidal have been let to the J. H. Corbett Construction Co., and it is expected that this branch work will be finished about the same time the main line is completed. A contract for the work on the main line between Knoxdale and the Allegheny river was let last year to the J. H. Corbett Construction Co. (Jan. 14, p. 1114.)

PHOENIX & BUCKEYE.—An officer writes that the projected route is from Phoenix, Ariz., westward for 50 miles towards Yuma. Last year the company secured considerable right-of-way and \$25,000 in bonus subscriptions and the legislature has also passed a ten-year tax exemption act. The failure to secure financial backing induced the company to open negotiations with the Arizona Eastern interests to take over the assets of the company and build the line to the east side of

the Hassayampa river by August, 1910. This proposition will be accepted, provided the company will secure an ordinance permitting it to build a line into Phoenix from the west, as well as secure some additional rights-of-way. L. H. Landis, general manager, Phoenix.

QUANAH, ACME & PACIFIC.—An officer writes that this company, which now operates 43 miles of railway from Quanah, Tex., west via Acme to Paducah, in Cottle county, has engineers at work in the direction of both Roswell, N. Mex., and El Paso, Tex., to secure the shortest and best route across the plains to El Paso; also for branch lines to the west and northwest of the Panhandle country. The ascent to the plains and through the Cap Rock region offers considerable difficulties, which can only be overcome by expensive work, consisting of deep cuts and high fills. The engineering corps expects to submit plans about the middle of June for overcoming most of these difficulties. (May 6, p. 1184.)

RANGELEY LAKES & MEGANTIC.—Incorporated in Maine with a capital of \$100,000 to build from a point at or near Oquossoc, Me., on the Rumford Falls branch of the Maine Central, northerly, following the Kennebec river to the Canadian border, about 30 miles. The new line will traverse an important lumbering, fishing and hunting section. Lucius Tuttle, president of the Boston & Maine and the Maine Central, is president of the new company, and stockholders of both these companies are interested.

SALT LAKE & IDAHO.—See Oregon Short Line.

SALT LAKE & OGDEN.—According to press reports this company has completed the electrification of its line from Salt Lake City, Utah, north to Ogden, 35.50 miles, and electric trains are now in operation. (April 8, p. 971.)

SAN ANTONIO, RIO GRANDE & TAMPICO.—According to press reports application has been made to the Railroad Commission of Texas to issue bonds for \$1,440,000 on 90 miles of this line, under construction from San Antonio, Tex., southwest to a point in La Salle county, 90 miles. The line is eventually to be extended to a point in Mexico. It is said that grading has been finished on 18 miles and it is expected that about 45 miles will be in operation this year. The Harrison Engineering Co., New York, are the engineers and contractors. J. F. Edwards, president, and G. W. Nock, chief engineer, San Antonio. (March 25, p. 850.)

VERA CRUZ, TABASCO & CAMPECHE.—A contract has been entered into between the Mexican government and this company for the construction of this line from Santa Lruccia, on the Tehuantepec National, northeast to Campeche, where connection is to be made with the United Railways of Yucatan. The line is to be about 470 miles long. A preliminary survey has already been made. In addition to the subsidy granted by the federal government, it is said that the states of Chiapas, Campeche and Tabasco will grant liberal subsidies to the proposed line. Donato Chapearuge, president, Mexico City. (See Mexican Roads, April 1, p. 918.)

WESTERN MARYLAND.—Negotiations are pending with the city officials of Baltimore, Md., for water front property, 50 ft. x 350 ft., adjoining the Port Covington terminals. The company proposes to make improvements at this place to cost \$500,000, including piers. An officer is quoted as saying that the company intends to spend not less than \$5,000,000 at Baltimore within the next few years. (May 13, p. 1237.)

WICHITA FALLS & NORTHWESTERN.—An officer writes that work is now under way on a line from Elk City, Okla., north to Hammond, about 20 miles. The company sublets the grading work by miles or short sections, and does its own bridging and track laying and putting up new buildings. The work involves the handling of 23,000 cu. yds. per mile. Maximum grade is to be .75 per cent., maximum curvature 3 degs. The Altus, Wichita Falls & Hollis is building from Altus, Okla., west to the Texas-Oklahoma state line, 42 miles, and the Wichita Falls & Wellington is building from the Texas-Oklahoma state line west to Wellington, Tex., 15 miles. Both these companies have the same officers as the Wichita Falls & Northwestern, and the work is being carried out on the same plan of letting contracts. (April 8, p. 971.)

WICHITA FALLS & WELLINGTON.—See Wichita Falls & Northwestern.

Railway Financial News.

ALABAMA & VICKSBURG.—Stockholders are to vote June 10 on the question of increasing the authorized capital stock.

BUFFALO & SUSQUEHANNA.—A committee has been organized to protect the interests of the preferred stock, and asks the deposit of preferred stock with the Central Trust Co., New York. The committee consists of J. N. Wallace, chairman; Frank Bergen, Walter P. Bliss, Henry Evans and J. S. Frelinghuysen; David Rumsey is counsel and Hugh Rankin, secretary, 46 Cedar street, New York.

CENTRAL NEW ENGLAND.—The company has asked the New York Public Service Commission, Second district, for permission to make a mortgage for \$25,000,000 and to issue immediately \$12,419,000 bonds to refund outstanding bonds. The commission on August 11, 1909, refused permission to the company to make a new mortgage because provision was not made for \$2,331,376 bonds outstanding owned by others than the New York, New Haven & Hartford. The company in the present application has sought to overcome the objections of the commission.

CHESAPEAKE & OHIO.—The directors have declared a quarterly dividend of 1¼ per cent., payable June 30, on the outstanding \$62,798,300 stock. This compares with quarterly dividends of 1 per cent. paid since June, 1909, and places the stock on a 5 per cent. annual basis, as compared with a previous 4 per cent. annual basis. From 1899 to 1908 1 per cent. was paid annually.

CHICAGO, CINCINNATI & LOUISVILLE.—The amounts found to be due, including interest, under the order of foreclosure sale, are as follows: \$1,425,315 on receiver's certificates; \$3,431,000 on general and refunding mortgage bonds; \$2,050,126 on Cincinnati, Richmond & Muncie mortgage bonds; \$860,394 on Chicago & Cincinnati mortgage bonds, and \$676,560 on Cincinnati & Indiana Western mortgage bonds. There is also considerable floating debt, said to be about \$1,500,000.

FLORIDA RAILWAY.—There was recently offered in Paris \$4,000,000 first mortgage 5 per cent. bonds at 472 francs (par value \$100, 518 francs). The company has a line in operation from Live Oak, Fla., to Perry, 59 miles, and is authorized to build a line, including the portion now in operation, from Tallahassee to Fernandina and Jacksonville, 224 miles.

GENEVA & AUBURN.—See an item in regard to this company in State Commissions.

GEORGIA RAILROAD & BANKING Co.—Stockholders have adopted a resolution requesting the directors as soon as possible to increase the annual dividend on the \$4,200,000 stock from 11 per cent. to 12 per cent. The road is operated under lease by the Louisville & Nashville and the Atlantic Coast Line, the rental being \$600,000 per year, which is equal to 11 per cent. on the stock and interest on outstanding bonds. On January 1 \$1,000,000 6 per cent. bonds matured and were refunded at 4 per cent., reducing the interest charge by \$20,000, which is about one-half the amount required to pay an additional 1 per cent. in dividends.

HOUSTON & TEXAS CENTRAL.—The Texas Railroad Commission has authorized the company to issue \$2,383,000 first mortgage 30-year 6 per cent. bonds to be secured on the line from Mexia to Nelleva, 94 miles. The company is authorized to issue \$484,393 additional bonds as required for completion and improvement of the road.

LOS ANGELES PACIFIC Co.—An official of the Southern Pacific says that his company has bought from General M. H. Sherman and E. P. Clark their minority interests in the stock of the Los Angeles Pacific Co. It is said that the Southern Pacific now owns the entire capital stock of the Los Angeles Pacific.

NEW YORK, NEW HAVEN & HARTFORD.—See Pennsylvania Railroad.

PENNSYLVANIA RAILROAD.—Wm. A. Read & Co. and Kountze Brothers, of New York, and Edward B. Smith & Co., of Philadelphia, are offering \$11,000,000 Pennsylvania general

freight equipment trust 4 per cent. certificates of May 2, 1910, due in annual instalments of \$1,100,000 from May 1, 1911-1920, at varying prices for the different maturities, yielding 4½ per cent. on all maturities. The equipment certificates are guaranteed principal and interest by the Pennsylvania Railroad.

In regard to rumors that the Pennsylvania Railroad has been acquiring additional stock of the New York, New Haven & Hartford, President Mellen, of the New Haven, says that the total holdings of the Pennsylvania Railroad now amount to about \$6,000,000 stock of the New Haven. This is an increase of about \$5,000,000 over the amount of stock held at the end of the calendar year 1909.

PITTSBURGH & SHAWMUT.—The following directors have been elected: Henry Bronner, H. E. Huntington, Edwin Hawley, Frank Trumbull, Theodore P. Shonts, W. H. Taylor. General Thomas H. Hubbard remains on the board.

ST. LOUIS SOUTHWESTERN.—An equipment trust agreement has been made securing \$460,000 series A 5 per cent. equipment trust certificates dated April 1, 1910, due in 10 annual instalments of \$46,000 each, beginning April 1, 1911.

SOUTHERN INDIANA.—The following reorganization committee has been elected by the committees representing the several bond issues: E. K. Boisot, chairman, representing the general mortgage 5 per cent. bondholders' committee; A. G. Hodenpyl, representing the first mortgage 4 per cent. bondholders' committee; Charles D. Smithers, representing the Chicago Southern 5 per cent. bondholders' committee, and M. B. Johnson, representing Cleveland interests.

SOUTHERN PACIFIC.—See Los Angeles Pacific Co.

WABASH.—See Wabash-Pittsburgh Terminal.

WABASH-PITTSBURGH TERMINAL.—Judge Taylor, of the United States district court of Northern Ohio, has appointed May 26 as the date on which he will hear the application of the Mercantile Trust Co., trustee of the Wabash-Pittsburgh Terminal first mortgage bonds, for an order directing the receiver of the Wheeling & Lake Erie to account for all moneys that should have been paid over to the Terminal Co. since August 22, 1908, under trackage and traffic contracts. Since the above date the Wheeling has made no payments under an order of the court permitting the receiver to suspend the same. In a few days by direction of the Mercantile Trust Co. the receivers of the Terminal railway are to commence suit against the Wabash Railroad for the amounts due from that company to the Terminal railway under the same tri-party contract. The Wabash at the time the Wheeling discontinued making payments ceased making payments also. The court will be asked for an accounting in the case of the Wabash and in the case of the Wheeling for an order directing the receiver to set aside as a special deposit the sums already due and to segregate in the future from the Wheeling's earnings such amounts as might be due under this contract and to hold these subject to the determination by the court of the validity of the contract and the rights of the Terminal railway bondholders herein.

From June 30, 1908, to June 30, 1909, the amount due from the Wheeling was \$162,104, representing the money due for the fiscal year, subsequent to suspension of payments. For the Wabash it amounted to \$71,589. For the fiscal year to end on June 30 next these amounts will be considerably in excess of the above figures as a result of more normal traffic conditions this year, as compared with the previous year.

The highest amounts ever paid over under these contracts was in the fiscal year ending June 30, 1907, when actual receipts from the Wheeling were \$248,340 and from the Wabash \$132,075, a total for the Terminal Co. of \$380,415. The sums due for the current fiscal year are expected to closely approximate these amounts.

WASHINGTON, BALTIMORE & ANNAPOLIS.—This company, which guarantees the interest on the Baltimore Terminal Co. first mortgage 5 per cent. bonds, made arrangements for the payment of the interest on these bonds (due March 1, 1910), to be paid May 19 at the Citizens Savings & Trust Co., Cleveland.

WHEELING & LAKE ERIE.—See Wabash-Pittsburgh Terminal.

Supply Trade Section.

The Camel Co., Chicago, has moved its offices from the Old Colony building to the McCormick building.

The Barnett Equipment Co., New York, has moved its office from 2 Rector street to room 1409, 30 Church street.

At the quarterly meeting of the Ward Equipment Co., New York, held May 24, a 5 per cent. dividend was declared, payable May 27.

The Indianapolis Switch & Frog Co., Springfield, Ohio, has opened an office at 1528-1529 McCormick building, Chicago, in charge of J. C. Jameson.

The Duplex uncoupler and automatic release, manufactured by the National Railway Devices Company, Chicago, will be used on the 1,000 Chicago, Burlington & Quincy gondola cars recently ordered of the Pressed Steel Car Co.

Recent shipments of Newton cupolas, reported by the Engineering Works, Detroit, Mich., include a 12-ton-hour capacity cupola to the Specialty Foundry Co., two 9-ton-hour capacity cupolas to the Ford Motor Co., one 5-ton-hour capacity cupola to the Massey Gin & Machine Co., one 3-ton-hour capacity cupola to the Hamden Foundry Co., and one 7-ton-hour capacity cupola to the Orrville Pump Co.

The Isthmian Canal Commission will receive bids until June 9 for steel, iron, bronze, copper, steel and copper tubing, pipe and fittings, exhaust valve, stovepipe, wire cable, rivets, bolts, nuts, taps, reamers, dies, bits, files, jacks, diaphragm pumps, boiler-tube expanders, machinist's clamps, engine lubricators, oilers, gage glasses, garbage cans, steam whistles, gaskets, leather fillet, leather belting, cardboard, etc., (Circular No. 585); and until June 17 for lumber, piles and vandum steel chain (Circular No. 584).

S. W. McMunn, president of the Brown Process Company, Chicago; the Cameron Septic Tank Company, the Monarch Supply Company and several others, who died at Chicago on April 29, was born at Sharon, Ohio, on March 20, 1850. He organized the American Brake Company in 1880. He also organized the Car Coupler Company. In 1890 he was a special sales representative of the Carnegie-Phipps Company, and in 1894 went with the Otis Steel Company. He was also an organizer of the Kindl Car Trunk Company and the United States Steel Piling Company.

TRADE PUBLICATIONS.

Electric Fans.—The Sprague Electric Co., New York, has issued its catalogue No. 321 containing full descriptions, with illustrations, of its electric fans.

Kerosene Torch.—The Hauck Manufacturing Co., New York, has recently issued pamphlet No. 31 describing its new patented kerosene torch suitable for general shop work.

Steel Mine Timber.—The Carnegie Steel Co., Pittsburgh, Pa., has recently issued a pamphlet containing a number of full-page illustrations of country and city roads and avenues on which its Tarvia has been used as a binder with macadam.

Gas Compressors.—The Ingersoll-Rand Co., New York, has issued bulletin No. 3,017, containing a general description of the design, parts and installation of its gas compressors, along with a number of illustrations of completed installations.

Road Preservatives.—The Barrett Manufacturing Co., New York, has just issued a pamphlet containing a number of full-page illustrations of country and city roads and avenues on which its Tarvia has been used as a binder with macadam.

Nut and Bolt Fasteners.—The United Nut Lock Co., Springfield, Mass., has issued a pamphlet describing the "Hugtite" nut and bolt fastener, which is adapted for steam and street

railway equipment of all classes, motor-driven vehicles, general machinery, etc.

Electric Hoists.—The Sprague Electric Co., New York, has issued catalogue No. 233 containing general descriptions of its electric monorail hoists. A number of half-tone illustrations show this hoist in detail and others illustrate car and locomotive shop installations.

Garland Devices.—Burton W. Mudge & Co., Chicago, has issued an announcement that hereafter Garland ventilators and all other Garland devices will be sold exclusively by this company. The folder calls attention to the application of this ventilator to passenger cars.

Elaterite Water Proofing.—The Western Elaterite Roofing Co., Denver, Colo., is distributing a folder bearing an extract and illustration from an article on a "Reinforced Concrete Water Tank in Mexico," which appeared in the *Railway Age Gazette* of September 10, 1909. The company's Werco liquid waterproofing cement was used in this tank with good results.

Mazda Economy Diffusers.—The General Electric Co., Schenectady, N. Y., has issued bulletin No. 4,729, superseding bulletin No. 4,660, which illustrates and describes the various types of Mazda economy diffusers. The special advantages claimed for this type of diffuser are wide range of capacity, relatively low intrinsic brilliancy, with excellent diffusion and economical distribution of light.

Generators and Exhaust Fans.—The Crocker-Wheeler Co., Ampere, N. J., has issued bulletin No. 119, superseding bulletin No. 107, on direct-current lighting and power generators; bulletin No. 121 on small engine type direct-current generators, and bulletin No. 124, superseding bulletin No. 112, on exhaust fans. These are the standard bulletins for loose leaf covers issued by this company and contain a number of detail and installation illustrations.

RAILWAY STRUCTURES.

BELLE VERNON, PA.—An officer of the Pittsburgh & Lake Erie writes that bids are being asked for putting up a brick passenger station in Belle Vernon, to cost \$15,000. (May 20, p. 1285.)

CELILO, ORE.—A contract is said to have been given by the Oregon Trunk Line to Porter Brothers for building the substructure of the large bridge over the Columbia river near Celilo. It is understood that the contract is valued at \$850,000. Contract for the steel superstructure will probably be let in a few days. (Dec. 17, p. 1218.)

CINCINNATI, OHIO.—The Cincinnati Union Depot Terminal Co. has been incorporated with \$1,000,000 capital. The company proposes to build a union station in the central southern part of Cincinnati. The location proposed for the main building is on the north side of Third street between Walnut and Main streets, nearly an entire square. The president is A. S. White, president of the Columbia Gas & Electric Co., and the other officers are: Vice-president and general manager, J. E. Bleekman, and secretary and treasurer, F. R. Williams, treasurer of the Cincinnati Trust Co. The other directors are: G. H. Worthington, Cleveland; G. L. Seasongood, L. J. Hauck and C. Bentley Matthews. The promoters of this company say that their scheme is designed to benefit all of the railways entering the city; but the principal companies do not appear as yet to have given their approval of the idea; and the project at present seems to be one to build a large office building, 20 stories high, with a view to deriving an income from office rents. It is reported that some of the interurban lines are interested. An officer of the Pennsylvania says that that company has no connection with the new company and that no definite conclusions as to a union station have been reached by the interested railways; and an officer of the New York Central Lines makes a statement to substantially the same effect. (May 20, p. 1285.)

CLINTON, IOWA.—Contracts are said to have been given by the Chicago & North Western to P. V. Clarke, Clinton, Iowa, for building 15 reinforced bridges, four on the Anamosa branch, one on the Iowa division, and 10 on the Iowa & Minnesota division.

COLUMBIA, Mo.—See North Missouri Central under Railway Construction.

EUREKA, KAN.—The Atchison, Topeka & Santa Fe plans to build a one-story brick station with tile roof.

GREAT BEND, KAN.—The Atchison, Topeka & Santa Fe will build a new passenger station of brick, 40 ft. x 150 ft., modern in every respect. A new roundhouse to cost \$40,000 is also to be built.

HOBOKEN, N. J.—The Public Service Railway Co. has opened for traffic its large new terminal at Ferry street and Hudson place in Hoboken.

KANKAKEE, ILL.—The Chicago, Indiana & Southern has prepared plans for a concrete trestle over the Kankakee river, to cost \$50,000.

LAFAYETTE, IND.—According to press reports the Chicago, Indianapolis & Louisville has given a contract to the Lafayette Engineering Co. for building an addition to the repair shops in Lafayette. The new building is to be 110 ft. x 175 ft., and will join the present end of the western building. The contract is said to be worth \$30,000. Machinery is to be installed at an additional cost of about \$25,000. Six new engine pits will be built, one of which will be a drop pit. Work on the improvements is to be started at once and finished within 60 days.

LEESVILLE, LA.—The Arnold Co., Chicago, has the contract for building a new locomotive repair shop for the Kansas City Southern. Work has already been started.

MAHONING, PA.—See Pittsburgh, Shawmut & Northern under Railway Construction.

MINNEAPOLIS, MINN.—An officer of the Great Northern is quoted as saying that a new union station will be built in Minneapolis. The work is to be finished in about 18 months.

NORTHTOWN, MINN.—The Northern Pacific has let the contract to a Minnesota firm for building a brick roundhouse to cost \$35,000.

OROVILLE, CAL.—The Southern Pacific, it is reported, will build a new passenger station.

PENSACOLA, FLA.—An officer of the Louisville & Nashville writes regarding the reports that land has been bought in Pensacola, to be used as a site for a passenger station to cost over \$200,000, that the company does not at present contemplate the construction of a passenger station at Pensacola.

PORTLAND, ORE.—The Spokane & British Columbia has received permission from the state to bridge the Columbia river near the mouth of the San Poil river.

QUEBEC, QUE.—According to press reports a site has been selected by the Grand Trunk Pacific for terminals in Quebec.

ST. LOUIS, Mo.—The St. Louis Southwestern has bought three city blocks and plans to build freight terminals. The property is adjacent to the present stations of the Wabash and the Missouri Pacific.

ST. PAUL, MINN.—The Great Northern has let the contract to a St. Paul firm for building a one-story brick and steel foundry building to cost \$85,000.

SEATTLE, WASH.—The Great Northern is to build a roundhouse in the local yards.

WHEATON, ILL.—The Aurora, Elgin & Chicago wants bids about May 30 for building a three-story brick station and office building.

WICHITA, KAN.—The Chicago, Rock Island & Pacific will build a power plant, roundhouse and repair shop. Plans are not yet completed.

Late News.

The items in this column were received after the classified departments were closed.

The Delaware, Lackawanna & Western is in the market for machine tools.

The Pennsylvania is reported in the market for 7,000 tons of structural steel for bridges.

The proposed advance in coal rates in Illinois is to be suspended for 60 days. The Interstate Commerce Commission will be asked at once to suspend the increased tariffs already filed, which were to have become effective on June 1.

The Cincinnati, Hamilton & Dayton is to install at its Toledo, Ohio, ore docks, a rotary converter of 600 to 800 k.w. capacity, a d.c. generator and other machinery for the operation of its ore handling plant. (February 18, Railway Structures.)

The Terminal Railroad Association of St. Louis has announced an increase of 5 per cent. in the wages of its 5,000 employees who receive less than \$200 a month. The Toledo & Ohio Central has increased the wages of conductors, brakemen, yardmen and switchmen.

The Indiana Railroad Commission has held that the Terre Haute, Indianapolis & Eastern Traction, in issuing to miners special tickets or trip books at a lower rate than is charged the general public, such transportation not being accessible to any other class of patrons is guilty of discrimination.

The Post Office Department has ordered all railways to install improved catching and delivering apparatus for mail bags at stations where trains do not stop before May 1, 1911. The Burr device, heretofore described in the *Railway Age Gazette*, has already been approved and recommended for installation.

Contracts are to be let by the New York Central & Hudson River for double-tracking a section of about 21 miles between Lockport, N. Y., and Albion. It is expected to have the work finished this coming fall. The shops at East Buffalo are to be enlarged by adding another building. The cost of the shop improvements, including equipment, will be about \$140,000.

Authority has been given the Westchester Northern Railroad by the New York Public Service Commission to construct its line from a connection in White Plains with the New York, Westchester & Boston to Lewisboro on the Connecticut border, and also a branch road from Pound Ridge to connect with the New York, New Haven & Hartford at the Connecticut border. The road is a New York, New Haven & Hartford subsidiary.

The United States Circuit Court of Appeals yesterday denied the petition of the Standard Oil Co. of New York for a rehearing of the appeal in the action instituted against it by the government, because of an admitted but trivial inaccuracy in the court's opinion rendered May 13. This opinion affirms the \$20,000 fine imposed by the district court of western New York for violations of the Elkins act in accepting concessions from railway companies on shipments of oil between Orlean, N. Y., and Rutland and Bellows Falls, Vt.

In the speech made by Senator La Follette on the railway bill now before Congress he said that nine of the provisions of the bill were of no value to the public. The four provisions of value to the general public found by Senator La Follette in the bill are: Authorizing the commission to control classification and to issue orders based upon investigations made on their own initiative. Authorizing the commission to establish through rates and authorizing the shipper to route his own shipment. Providing penalties for incorrect statement of rates by a railway company. Authorizing the commission to suspend a proposed new rate for four months.

The New York Public Service Commission, Second district, has denied the application of the Geneva & Auburn Railway for authority to issue \$50,000 6 per cent. cumulative preferred stock. Some time ago the railway company obtained

permission to refund \$450,000 outstanding bonds by the issue of \$400,000 new bonds. The company now says that at the time this refunding was done it agreed to issue to bondholders \$50,000 preferred stock in addition to the bonds. The commission holds, however, that since the refunding has already been done, and since the railway made no mention of its intention to issue preferred stock at the time it made its application for a bond issue, it is now in a position of asking for permission to issue stock for nothing, and therefore application is denied.

Joseph Richardson, chief clerk to the third vice-president of the Pennsylvania Railroad, has been appointed assistant to the third vice-president. The general coal freight agent will hereafter report to the freight traffic manager instead of to the third vice-president as heretofore. J. G. Searles, general coal freight agent at Philadelphia, Pa., has been assigned to other duties on account of ill health, and Robert H. Large, coal freight agent, succeeds Mr. Searles. Supervision of the freight traffic of the Erie & Western Transportation Co. will now be under the direction of the freight traffic manager of the Pennsylvania Railroad, and Walter Thayer, formerly eastern manager of the Anchor Line, has been promoted to general freight agent of the Erie & Western Transportation Co. and assistant general freight agent of the Pennsylvania Railroad.

The increase in the fares on the Boston & Maine, on all except the Fitchburg division, will go into effect July 1, owing to the fact that the rates could not be made up in time for June 1, as they had to be filed with the Interstate Commerce Commission for 30 days before going into effect. The Fitchburg division rates were completed in time. The rates on the Massachusetts Central division will be increased slightly, the largest increase being 19 cents, this being to Northampton, Hadley and South Amherst. The first increase is made at Gleasondale, which is 26 miles from Boston, at this point the fare being increased two cents. At a number of the stations beyond Gleasondale the fares were increased two cents. The most important changes were as follows: Clinton Junction, from 70 to 76 cents; Clinton, from 75 to 80 cents; Bondsville, from \$1.60 to \$1.68; Belchertown, from \$1.71 to \$1.81; Pansy Park, from \$1.80 to \$1.93; South Amherst, from \$1.85 to \$1.99; East Hadley, from \$1.95 to \$2.11; Hadley, from \$1.98 to \$2.17; Amherst, from \$1.90 to \$2.06; Northampton, from \$2.04 to 2.23.

The Southern Railway has just announced details of its most recent car, locomotive and rail orders, involving a total expenditure of \$7,290,000. The order included 75 locomotives ordered from the Baldwin Locomotive Works at an expense of \$1,500,000, as follows: Thirty-eight consolidation freight, 25 Pacific type passenger, 10 switching and two Mallet freight for delivery during September or October. There were 3,620 all-steel 50-ton coal and coke cars to cost \$3,900,000, as follows: Two thousand to be built by the Western Steel Car & Foundry Co., 1,120 by the Cambria Steel Co., and 500 by the Standard Steel Car Co. It is expected that these cars will be in service by July, 1910. The 10 combination passenger and baggage cars, as reported in the *Railway Age Gazette* of April 8, will be built by the Hicks Locomotive & Car Works at a cost of \$90,000. In addition to the above, the company is building at its Lenoir car works 1,000 steel underframe ventilated box cars and 200 steel underframe stock cars, and 205 steel underframe ventilated box cars for the Georgia & Florida. Upon the completion of this work about August 1 construction will be started on 1,000 additional steel underframe, 40-ton ventilated box cars for the Southern. The steel rail and fittings, representing an outlay of \$1,800,000, will be used in improving the lines by replacing lighter rail and also in the carrying out of the company's plans for double-tracking its more important lines. The completion of work on 60 miles of double-track under construction will give 244 miles of double-track between Washington, D. C., and Atlanta, Ga., while there are 95 miles of double track now in use on other lines of the system. Thirty thousand tons of this rail will be furnished by the Tennessee Coal, Iron & Railroad Company from its Birmingham plant; 10,000 tons will be furnished by the Maryland Steel Company, and 6,000 tons by the Cambria Steel Company.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Butte, Anaconda & Pacific has ordered one consolidation locomotive from the American Locomotive Company.

The Chicago Junction has ordered five six-wheel switching locomotives from the American Locomotive Co.

The Morgantown & Dunkard Valley is in the market for one 16-ton switching locomotive. J. Martin, general manager, Morgantown, W. Va.

The Long Island, reported in the *Railway Age Gazette* of May 6 as having ordered 100 freight cars, has ordered 100 swing side gondola cars from the Pressed Steel Car Co. These cars will have a capacity of 50 tons and will weigh 45,000 lbs. They will be 37 ft. 5 in. long, 9 ft. 4 in. wide and 3 ft. 10 3/4 in. high, inside measurements, and 40 ft. 2 in. long, 10 ft. 2 in. wide and 8 ft. 8 1/2 in. high, over all. The bodies will be of wood and steel and the underframes of steel. The special equipment includes:

Axles	Open-hearth steel
Bolsters, body and truck	Steel
Brakes	Westinghouse
Brake-beams	L. I. standard
Brake-shoes	Cast iron M. C. B.
Brasses	Ajax
Couplers	M. C. B.
Draft gear	Westinghouse
Journal boxes	Cast iron
Paint	L. I. standard
Springs	Union Spring & Mfg. Co.
Trucks	5 1/2 in. x 10 in. arch bar
Wheels	Cast iron M. C. B.

CAR BUILDING.

The Alfalfa Products Company, Fremont, Neb., is in the market for a number of large tank cars.

The Northern Pacific is reported as being in the market for 1,000 all-wood refrigerator cars. This item is not confirmed.

The Slippery Rock & Grove City, an electric line under construction from Slippery Rock, Pa., to Grove City, is in the market for electric cars.

The Pacific Fruit Express, mentioned in the *Railway Age Gazette* of March 25 as considering the purchase of 2,000 refrigerator cars, is said to have ordered this equipment from the Pullman Co. This item is not confirmed.

The Northwestern Pacific, reported in the *Railway Age Gazette* of April 15 as being in the market for freight equipment, has ordered 100 flat cars, 50 box cars and 15 gondola cars.

The Louisville & Nashville, reported in the late news of last week as building 1,200 freight cars at company shops, is building 1,400 cars, 700 each at the South Louisville and the New Decatur shops. All materials for these cars has been ordered.

The Chicago Great Western, reported in the *Railway Age Gazette* of May 20 as being in the market for passenger cars, has ordered five 60-ft. coaches, two combination buffet, library, smoker and chair cars, and one dining car from the Pullman Company. This equipment will be all-steel.

The Harriman Lines freight equipment order, mention of which was made in the *Railway Age Gazette* of May 20, includes 12,440 cars, as follows: 5,750 fifty-ton box cars, with Bettendorf under and side frames; 1,000 fifty-ton automobile cars, with Bettendorf frames; 1,800 forty-ton stock cars, with steel underframes; 65 caboose cars, with steel platforms; 1,325 fifty-ton flat cars, with Bettendorf underframes; 1,200 fifty-ton all-steel Hart convertible cars; 150 fifty-ton hopper bottom coal cars, with steel underframes; 750 fifty-ton steel underframe tight bottom gondola cars, and 400 fifty-ton steel underframe drop bottom gondola cars. The box, automobile, stock and caboose cars were ordered from the American Car & Foundry Co.; the flat cars from the Bettendorf Axle Co.; the Hart convertible cars from the Rodger Ballast Car Co., and the coal and gondola cars from the Cambria Steel Co.

The following box cars are for delivery in October: For the Union Pacific, 750; Oregon Short Line, 800; Oregon Railroad & Navigation Co., 1,200; Central Pacific, 520; Southern Pacific, 780; Southern Pacific of Mexico, 100; Arizona Eastern, 100; Sonora Railway, 50; Oregon & Washington, 250; Galveston, Harrisburg & San Antonio, 500; Louisiana Western, 200; Houston East & West Texas, 100; Morgan's Louisiana & Texas, 100; Texas & New Orleans, 300; Texas Central, 300. The following automobile cars are for delivery in November: For the Union Pacific, 500; Central Pacific, 200, and Southern Pacific, 300. The following stock cars are for delivery in November: Union Pacific, 300; Oregon Short Line, 300; Oregon Railroad & Navigation, 200; Oregon & California, 100; Central Pacific, 200; Southern Pacific, 300; Galveston, Harrisburg & San Antonio, 200; Houston & Texas Central, 100; Southern Pacific of Mexico, 50, and Sonora Railway, 50. The following caboose cars are for delivery in October and November: Union Pacific, 25; Oregon Short Line, 20; Oregon Railroad & Navigation, 12, and Southern Pacific of Mexico, five. Delivery of the following flat cars begins August 15: Union Pacific, 200; Oregon Railroad & Navigation, 300; Oregon & California, 100; Central Pacific, 240; Southern Pacific, 360; Sonora Railway, 100, and Arizona Eastern, 25. Delivery of the Hart convertible cars begins August 15, as follows: Union Pacific, 750; Oregon Short Line, 150; Central Pacific, 120, and Southern Pacific, 180. Delivery of the coal cars begins August 15, as follows: Oregon Short Line, 100, and Southern Pacific of Mexico, 50. Delivery of the tight bottom gondola cars begins August 15, as follows: Southern Pacific, 450, and Central Pacific, 300. The drop bottom gondola cars are for the Oregon Short Line.

IRON AND STEEL.

The Monongahela has ordered 900 tons of rails.

The Wichita Falls & Northwestern has ordered 1,000 tons of rails.

The Cincinnati, Hamilton & Dayton has ordered 1,500 tons of structural steel for a bridge near Hamilton, Ohio.

The Cleveland, Cincinnati, Chicago & St. Louis has ordered 4,600 tons of structural steel for its Beech Grove, Ind., shops.

SIGNALING.

The Federal Signal Co. has taken the contract to make and install an interlocking plant for the Philadelphia & Reading at Oley street, Harrisburg, Pa.

The School of Railway Signaling, Utica, N. Y., has lately enlarged its quarters and now occupies the entire front of the first floor of the Williams building. This correspondence school, now four years old, has 1,000 students, some of them residing in France, Japan, Central America and other foreign lands. The officers of the school are: H. C. Williams, president; F. B. Harrington, vice-president; E. J. Weitzel, secretary and treasurer; F. C. Lavarack, director of instruction, and C. J. Gomph, registrar.

New City for Steel Workers.

Woodlawn, the new city which is being built by the Jones & Laughlin Steel Company, Pittsburgh, Pa., adjoining the new furnaces, steel, rod, wire and tin mills of the company's Aliquippa department, will add a beautiful new suburb to Pittsburgh. It is estimated that within a year its population will be 10,000.

Work was commenced on Woodlawn last summer and some of the houses were completed in time for winter occupancy by Jones & Laughlin employees, while others are being taken almost as fast as they are finished. The new works are attracting iron and steel workers of the better class and the new town is designed to give them the very best homes with the most beautiful, convenient and healthful surroundings. The houses being put up by the company contain from six

to ten rooms and bath, are built of brick, cement or frame, or combinations of these materials, and are in every respect as attractive and convenient as any suburban town in the district, and are above the average city home in point of comfort and convenience.

Woodlawn is situated on the main line of the Pittsburgh & Lake Erie, which is building a handsome new station there for frequent and fast trains to the city.

Millis Combination Door and Hanger.

The Millis combination door and hanger, handled by the Planet Co., Chicago, is illustrated in the accompanying cuts, Figure 1 showing its application to a single deck stock car and Figure 2 to a double deck car. The door is entirely of metal and suspended from the car by a 1-in. pipe, twice the

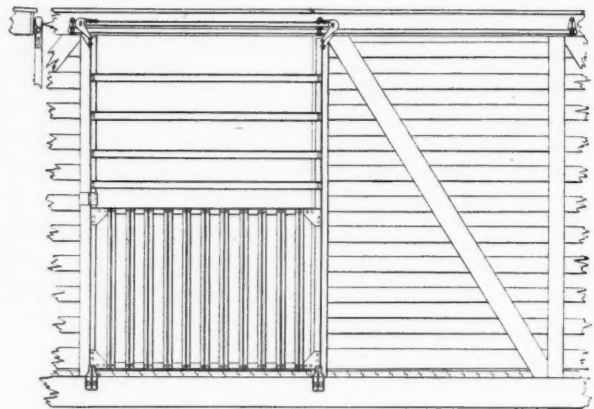


Fig. 1—Millis Door on Single Deck Stock Car.

length of the door opening. The frame of the door is made of angle irons, the corners being connected by gusset plates to prevent lateral motion. The slats are either angle irons or light T-irons, riveted to the frame with two rivets at each end. The hangers are malleable iron and form a part of the frame. The rollers are so boxed in that if they break the door can drop only a quarter of an inch and will still operate. The roller pin is protected from wear by being squared at the back to prevent its turning in the casting. It is held in place by a cotter key which cannot shake out. The pipe rail is placed immediately under the top angle

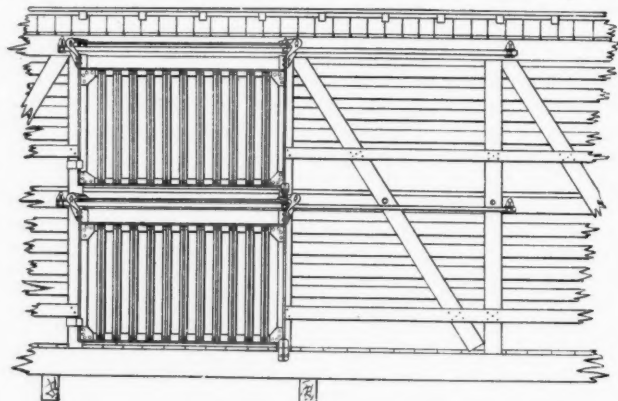


Fig. 2—Millis Door on Double Deck Stock Car.

tile, which, in double deck cars, prevents manure from the upper deck from lodging on the lower door rail and preventing the operation of the door. The bottom of the door is a half inch above the top of the floor to allow accumulations to flow out under the door, which eliminates much of the trouble in the operation of such doors. In case of accident the door can be taken from the car by removing two bolts, and repairs can be easily made.

The makers claim for the door that it is non-destructible, cannot be lost, and will operate under all conditions and in all climates. A number of the doors have been in actual service for the past two years, and are said to have given good satisfaction.